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# Plant response studies to utility construction in the Mohave Desert, California

to

Bureau of Land Management

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by

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# Plant response studies to utility construction in the Mohave Desert, California.

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Utility construction involves major disturbance to soil and vegetation along the many utility pathways in the Mohave Desert. No qualitative or quantitative estimates of such disturbance were available prior to 1975 when three studies were made by Vasek et. al., (1975) on natural gas pipelines, Johnson et. al., (1975) on highways and Vasek et. al., (1975) on power transmission lines, all in the Mohave Desert. These studies contributed much to an understanding of the effects of utility construction on desert vegetation. This study enlarges the work of these researchers by reporting comparable studies in expanded utility corridors. Six pipelines, seven powerlines and two aqueducts were selected for study. The work was begun in May, 1978 followed by extensive field work during the summer months with soil and transect analyses taking the remainder of the time through February 1, 1979.

The overall purpose of this project was to study the relationship of perennial vegetation diversity, stability and productivity to utility construction and maintenance activities, mainly: clearing of land within right of ways; clearing and maintenance of access roads; soil disturbnace and other physical damage due to construction activities. No attempt was made to study any deleterious consequences of power lines' electric and magnetic fields on vegetation, such as reported by Miller and Kaufman (1978) in which "leaf tip corona" may very rarely occur in plants with pointed leaves, where a field strength

of approximately 22.5 kV/m is needed for inception (Poznaniak and McKee, 1975).

We depended upon interpretation of existing patterns for the relationships, not attempting any cost prohibitive experimental manipulations at the ecosystem level.

## METHODS

Sources of information regarding history and construction dates of utility corridors were obtained from various personnel and files of the Bureau of Land Management, from utility company managers and from utility workers encountered in the field.

The corridors selected for study occur over representative topography, soils and vegetation types of the Mohave Desert (Figs. 1 and 2, Tables 1-4). The powerline construction dates range from 1924 to 1977, pipelines from 1956 to 1973 and the two dates of the aqueducts are 1913 and 1970.

Study areas, ranging from two to fifteen, were selected at intervals along each utility corridor. Primary comparisons were made among transects at each study area. Secondary comparisons were made between corridors and study areas.

The size of the sample plots (transects) at each study area was 100x2M for a total of $200M^2$. Comparisons within a study area consisted of uniform application of transects in control and disturbed sites for each corridor type. For all utility corridors the control transect A was placed in undisturbed vegetation 50M to one side of the utility right-of-way and parallel to it.

To test for distrubance, transects were placed within the utility corridor right-of-way in locations representative of construction disturbance.

For powerlines this consisted of: transect B, midway between the pylons and directly under the central transmission wire; transect C, directly under the pylons; transect D, at the edge of the access road. Since the pylons do not constitute a linear belt transect area, data from two or more consecutive pylons were pooled until a $200M^2$ area equal to each belt transect was sampled. Disturbance to pipelines were tested by transects placed: transect B, along the pipeline right-of-way where trench soil had been piled and then scraped away to refill the trench; transect C, directly over the pipeline where trenching had produced the most severe distrubance; transect D, at the edge of the access road. The distrubance transects of the two Los Angeles aqueduct corridors were placed: transect B, within the utility right-of-way and parallel to the aqueduct; transect C, along the edge of the access road. No transects were placed in the region of the aquedct equivalent to the trench of the pipelines because the construction methods preculded this. The aqueducts consist of a variety of sizes of pipes and box conduits depending on location and topography. Across major canyons and washes the aqueduct may consist of exposed pipes ranging in diameter from 1.95 to 2.2M for the 1970 aqueduct and from 2.28 to 3.04M for the 1913 aqueduct. Box conduits with an approximate dimension of 2.1 x 2.74M for the 1970 and 2.4 x 3.04M for the 1913 aqueducts were placed underground or through tunnels, depending the nature of the terrain. Our study sites were selected at representative areas along the corridors only where pipes were exposed and where conduits were buried just under the soil surface so as to be clearly visible. The soil mantle directly over the conduit was either lacking or too thin to support adequate vegetation at each study site, thus, no transects were placed here.

The four transects (three for the Los Angeles aqueducts) were read by measuring the height and diameter of each perennial plant. The diameter was measured across the densest part of the crown following the assumption that, on the average, plants cover a circular ground area (Brower and Zar, 1977). The ground cover was calculated from the radius and summed for each species. In the transects which contained extremely abundant small perennials, their number was counted for the full transect but height and diameters were measured on a percentage (10-15%) of individuals representative of appropriate size classes and extrapolated to their total density for determination of ground cover and volume.

Values of density, ground cover, volume and biomass were used for estimates of productivity. Ground cover ($M^2$) for each species in the $200^{m^2}$ transect was summed for a total. Percent total ground cover was determined by: Total % GC = $GC^{m^2} \div 200 \times 100$. Numerical density for perennials is the number of individuals (n) per $200^{m^2}$. Perennial plant volume, determined from diameter and height measurements, is shown for each transect as: $Volume^{m^3}/200^{m^2}$. Biomass of perennial species was calculated by: Biomass $K_g/200^{m^2}$ = $Volume^{m^3}/200^{m^2}$ X weight density value $K_g/M^3$. Biomass $K_g/M^2$ is obtained by dividing Biomass $K_g/200^{m^2}$ by 200. Weight density values, determined for each species by Dr. Hyrum B. Johnson and his Desert Plan Staff of the Bureau of Land Management, were made available for our calculations of biomass.

Productivity ratios (PR) were applied to estimates of change between disturbed and control transects (Vasek, et. al. 1975a). for density, cover, volume and biomass. PR = disturbed transect (test) ÷ control transect value. Percent change (Δ%) values (control - test ÷ control) were applied only to biomass in tables for estimates of productivity.

Equibility, in essence another measure of evenness, is given by Whittaker (1975) as

$$E_c \quad \frac{S}{(\log d\ max - \log d\ min)}$$

Stability of perennials along the utility corridors was estimated primarily by determinations of relative biomass in relation to relative age span, by comparing similarity among transects and by an estimate of community quality.

Relative age span determinations into long-lived perennials (LL) and short-lived (SL) are based primarily on the categories assigned to many desert species by Vasek et. al., (1975a, 1975b) and Johnson et. al., (1975).

To estimate community quality, we are following the Community Quality Index (CQI) as proposed by Vasek et. al. and Johnson, et. al. This index integrates an estimate of productivity, in this case plant cover, and an estimate of relative community age, namely the percentage of ground covered by long-lived species,

$$CQI = \sqrt{\text{\% Ground covered by long-lived perennials} \times \text{\% Total perennial ground cover}}$$

Transect similarily was compared by Jaccard's coefficient of community similarity (CCj) as proposed by Phillips (1959), Brower and Zar, (1977) and Vasek, et. al., (1975a). The formula is

$$CC_j = \frac{2C}{S_1 + S_2 - C}$$

where $S_1$ and $S_2$ = total biomass in communities 1 and 2 respectively and C = total biomass common to both communities.

In order to better interpret the significance of the several treatments, such as respresented by the different classes of transects, different corridors, as well as variations from one study area to another, we exposed the data of the CQI tables to three-way analysis of variance (Sokal and Rolf, 1969). We followed a similar proceedure for this as was reported in Vasek, et. al., (1975b).

A summary of the mean ($\overline{X}$) percent change ($\Delta\%$) of the biomass values of tables 8-22 was prepared to help illustrate possible changes brought about by utility construction activites. The formula:

$$\text{standard deviation} \div \sqrt{N}$$

was applied to the $\Delta\%$ means to give the standard error of mean.

Physical characteristics of the study areas are recorded in Table 4. Topographic location follows the "Tenative Land Form Classification for the California Desert" prepared by Zvi Brenner for the Bureau of Land Management, dated August 5, 1977. Community classification follows authors listed in table 6. Soil samples weighing >100 grams were collected at the 0-15 cm depth increment at the control transect at each study area. The soils were assessed for texture percent by the Bouyucos method (Black, et. al., 1965 and Lathrop, 1976). Sand was determined following forty seconds of the hygrometer run and silt was measured two hours later. The difference between the two runs was clay. Soil texture class was determined using the standard soil classification triangle for percent sand, clay and silt.

A recording soil penetrometer was used to measure soil compaction in right-of-way and control sites at a few study areas following winter

rains (Table 5, Figures 3-5). Topographical features of percent slope, exposure and elevation were determined from field use of the Speigel relaskop, Brunton compass and Taylor altimeter respectively (Table 4).

## ACKNOWLEDGEMENTS

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Technical and administrative personnel from several utility companies kindly supplies background information on utility corridors. Their names are too numerous to mention here, but since this information was vital to the project I must include the names space will permit. These include: Walt Richardson and Terry Yonkers, Southern California Edison Company; Lee Fast of the Southern California Gas Company and the companys' staff of the Newberry substation; Armando A. Galindo, Elmer Humphrey and Dennis Williams, Los Angeles Department of Water and Power. We also wish to thank the staff at the Dagget station of the Cal-Neva Gas company for their special help.

I am very grateful to several individuals for aid in preparing programs for statistical analysis; Drs. Paul Yahiku, Elwood McCluskey, Anthony Zuccarelli, Venus Clausen and Peter Rowland.

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For the final task of typing the manuscript, I am very grateful to Kathleen Dufur, Loma Linda University.

Table 1: Characteristics of the natural gas and petroleum pipelines.

PIPELINES

| Date | Location | Function | Ownership |
|---|---|---|---|
| 1956 | Topack to Quigly | Natural gas | Southern California Gas Co. |
| 1960 | Needles to Pisgah | Natural gas | Southern California Gas Co. |
| 1963 | Topack to Los Angeles | Natural gas | Pacific Gas and Electric |
| 1963 | Needles to Sheep Hole Pass | Petroleum products | Four Corners Pipeline Co. |
| 1970 | Dagget to Colton | Petroleum products | Cal-Neva Co. |
| 1973 | Dagget to Roach Station, Nevada | Petroleum products | Cal-Neva Co. |

Table 2: Characteristics of the power transmission lines.

KV's = Kilovolts per line.

POWER TRANSMISSION LINES

| Date | Location | No. Lines | KV's | Ownership |
|---|---|---|---|---|
| 1924 | Victorville to Vincent | 1 | 287 | LA Dept. of Water and Power |
| 1933 | Lugo to Roach Station, Nevada | 1 | 230 | Southern California Edison |
| 1944 | Victorville to Roach Station, Nevada | 3 | 287 | LA Dept. of Water and Power |
| 1952 | Brown to Los Angeles | 1 | 230 | LA Dept. of Water and Power |
| 1968 | Lugo to Vincent | 2 | 500 | Southern California Edison |
| 1969 | Pisgah to Piute Valley | 1 | 500 | Southern California Edison |
| 1977 | Coolwater to Kramer Jct. | 1 | 220 | Southern California Edison |

Table 3: Characteristics of the Los Angeles Aqueducts.

AQUEDUCTS

| Date | Location | Volume Capacity CU/FT/SEC | Ownership |
|---|---|---|---|
| 1913 | Owens Valley to Los Angeles | 490 | LA Dept. of Water and Power |
| 1970 | Owens Valley to Los Angeles | 290 | LA Dept. of Water and Power |

Fig. 1. The Mohave Desert region of Southern California showing the paths of the aqueducts ( ) and pipelines studied. The date of construction and number of study sites along each corridor are: ( ) 1913, 11; ( ) 1970, 15; ( ) 1956, 8; ( ) 1960, 6; ( ) 1963, 8; ( ) 1963, 2; ( ) 1970, 7; ( ) 1973, 6. Local highway numbers and other landmarks are indicated.

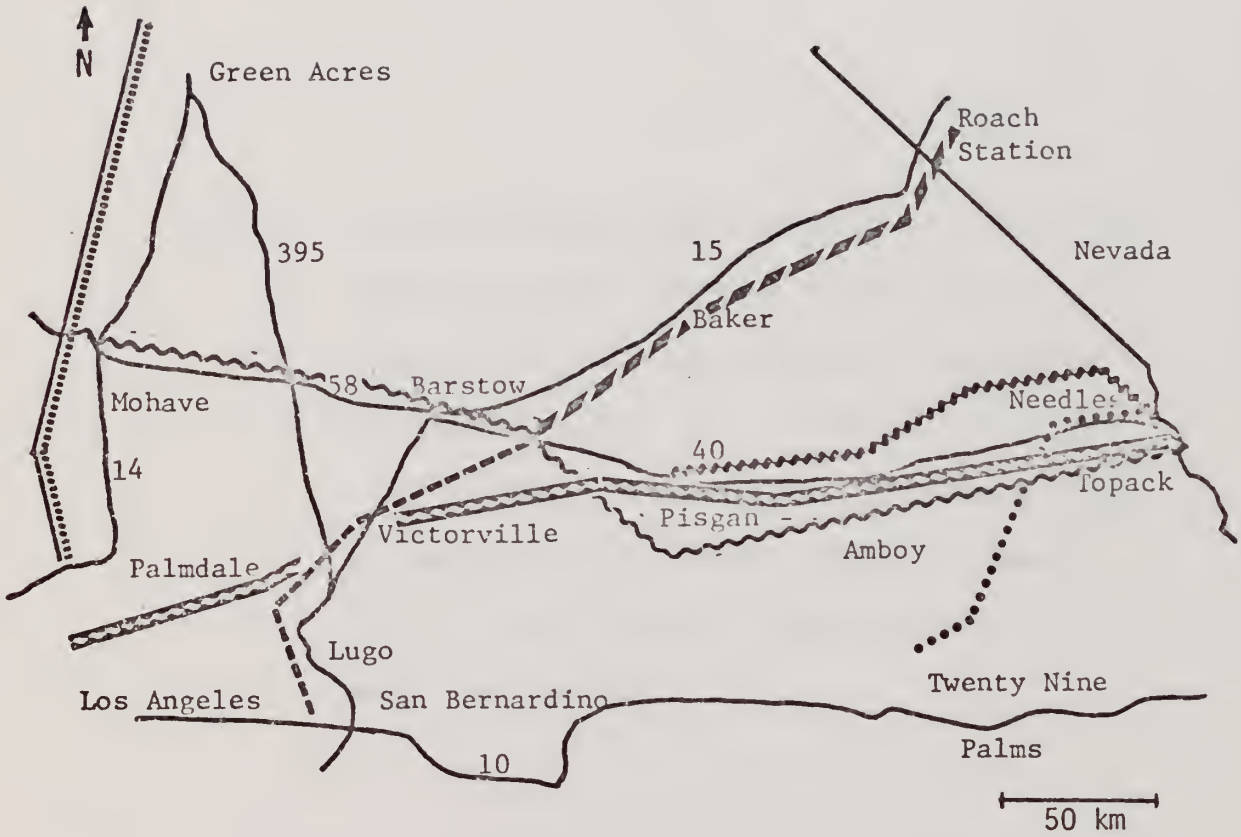

N
Green Acres
395
15
Roach
Station
Nevada
Baker
58
Barstow
Mohave
Needles
14
40
Topack
Pisgan
Victorville
Amboy
Palmdale
Lugo
Twenty Nine
Los Angeles
San Bernardino
Palms
10
50 km

Fig. 2. The Mohave Desert region of Southern California showing the paths of power lines studied. The date of construction and number of study sites along each corridor are: (〰) 1924, 7; (– – –) 1933, 7; (••••••) 1944, 10; (▰▰▰) 1952, 8; (▭▭▭) 1968, 5; (▥▥▥) 1969, 7; (〰〰) 1977, 6. Local highway numbers and other landmarks are indicated.

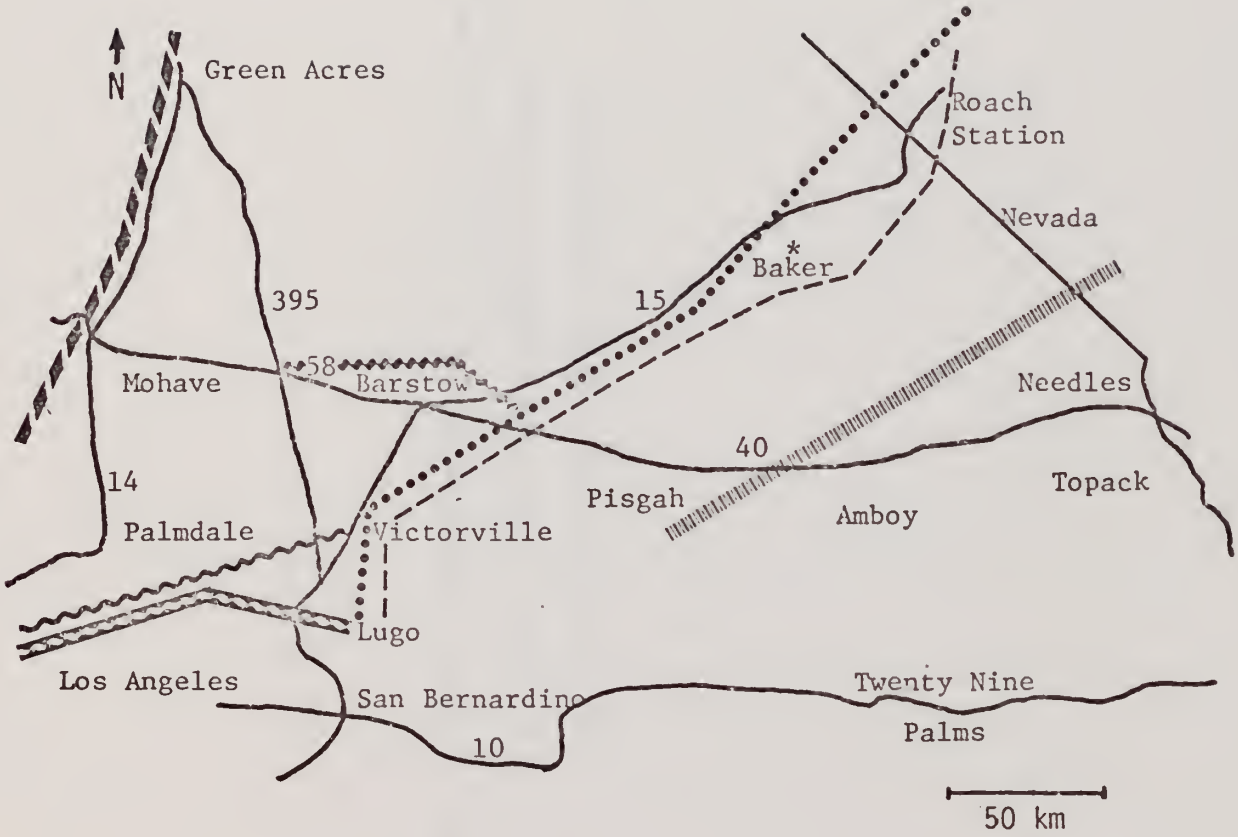

N
Green Acres
Roach
Station
Nevada
Baker
395
15
58
Barstow
Mohave
Needles
40
14
Pisgah
Topack
Palmdale
Victorville
Amboy
Lugo
Los Angeles
San Bernardino
Twenty Nine
Palms
10
50 km

Table 4: Physical characteristics of study areas along utility corridors in the Mohave Desert, California. Fan = alluvial fan;-year = date of construction.

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Natural gas pipeline - 1956 | | | | | | | | |
| 1 | Rocky Hill | E 12 | Creosote bush scrub | Silty clay | 75 | | 25 | 561 |
| 2 | Fan | Level | Joshua tree woodland | Silty clay loam | 40 | 10 | 50 | 945 |
| 3 | Mountain | SE 23 | Mountain scrub | Silty clay | 60 | | 40 | 1155 |
| 4 | Dissected fan | SW 7 | Creosote bush scrub | Sandy clay loam | 50 | 30 | 20 | 914 |
| 5 | Hill | SW 14 | Creosote bush scrub | Silty clay loam | 30 | 10 | 60 | 1143 |
| 6 | Pavement fan | S 7 | Creosote bush scrub | Clay | 80 | | 20 | 765 |
| 7 | Desert wash | S 7 | Cheese bush scrub | Loamy sand | | 90 | 10 | 765 |
| 8 | Sand covered fan | Level | Creosote bush scrub | Silty loam | 20 | 20 | 60 | 510 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Natural gas piepline - 1960 | | | | | | | | |
| 1 | Rocky hill | E 5 | Creosote bush scrub | Silty loam | 20 | 10 | 70 | 442 |
| 2 | Desert wash | NE 4 | Cheesbush scrub | Loamy sand | | 80 | 20 | 427 |
| 3 | Mountain | NW 23 | Mountain scrub | Silty clay loam | 30 | 10 | 60 | 1250 |
| 4 | Fan | S 2 | Creosote bush scrub | Sandy loam | 5 | 60 | 35 | 646 |
| 5 | Pavement fan | E 4 | Mountain scrub | Silty clay | 50 | | 50 | 899 |
| 6 | Fan | Level | Creosote bush scrub | Silty clay loam | 40 | 10 | 50 | 808 |
| Natural gas pipeline - 1963 | | | | | | | | |
| 1 | Alkali sink | Level | Salt bush scrub | Loamy sand | | 80 | 20 | 427 |
| 2 | Dry playa | Level | Salt bush scrub | Loamy sand | | 80 | 20 | 427 |
| 3 | Dry playa | Level | Shadscale scrub | Silty clay | 40 | | 60 | 427 |
| 4 | Lava flow | Level | Shadscale scrub | Clay | 75 | | 25 | 427 |
| 5 | Sand covered fan | W 7 | Cheesebush scrub scrub | Silty clay | 30 | 10 | 60 | 1103 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Natural gas pipeline - 1963 contd | | | | | | | | |
| 6 | Pavement fan | S 6 | Creosote bush scrub | Clay | 70 | | 30 | 518 |
| 7 | Rocky hill | W 7 | Creosote bush scrub | Silty clay loam | 30 | 10 | 60 | 549 |
| 8 | Desert wash | S 3 | Cheesebush scrub | Sandy loam | 10 | 60 | 30 | 328 |
| Petroleum products pipeline - 1963 | | | | | | | | |
| 1 | Dissected fan | Level | Creosote bush scrub | Silty clay loam | 30 | 20 | 60 | 624 |
| 2 | Pavement dis-sected fan | S 9 | Creosote bush scrub | Silty loam | 10 | 40 | 50 | 624 |
| Petroleum products pipeline - 1970 | | | | | | | | |
| 1 | Fan | Level | Creosote bush scrub | Silty clay loam | 30 | 10 | 60 | 518 |
| 2 | Rocky hill | Level | Creosote bush scrub | Silty clay | 50 | 10 | 40 | 838 |
| 3 | Sand dune | W 3 | Desert dune sand plant | Loamy sand | | 75 | 25 | 657 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Petroleum products pipeline - 1970 contd | | | | | | | | |
| 4 | Pavement dis-sected fan | W 9 | Creosote bush scrub | Silty clay | 40 | | 60 | 670 |
| 5 | Fan | Level | Salt bush scrub | Silty clay | 60 | | 40 | 521 |
| 6 | Sand covered fan | Level | Creosote bush scrub | Silty clay loam | 30 | 10 | 60 | 792 |
| 7 | Rocky hill | N 18 | Creosote bush scrub | Silty clay | 50 | 5 | 45 | 792 |
| Petroleum products pipeline - 1973 | | | | | | | | |
| 1 | Pavement fan | S 6 | Creosote bush scrub | sandy loam | 5 | 55 | 40 | 677 |
| 2 | Dissected fan | SW 7 | Creosote bush scrub | Sandy clay loam | 50 | 30 | 20 | 914 |
| 3 | Desert wash | E 6 | Creosote bush scrub | Sandy loam | | 60 | 40 | 610 |
| 4 | Dry playa | Level | Salt bush scrub | Loam | 10 | 50 | 40 | 350 |
| 5 | Fan | SE 3 | Creosote bush scrub | Sandy loam | 5 | 75 | 20 | 427 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Petroleum products pipeline - 1973 contd | | | | | | | | |
| 6 | Sand covered fan | Level | Creosote bush scrub | Loamy sand | | 70 | 30 | 206 |
| Power transmission line - 1924 | | | | | | | | |
| 1 | Fan | Level | Joshua tree woodland | Silty clay loam | 40 | 10 | 50 | 945 |
| 2 | Rocky hill | E 11 | Joshua tree woodland | Silt loam | 20 | 20 | 60 | 823 |
| 3 | Sand covered fan | N 4 | Creosote bush scrub | Silty clay loam | 40 | 15 | 45 | 1006 |
| 4 | Riverwash | N 3 | Salt bush scrub | Clay loam | 35 | 30 | 35 | 1006 |
| 5 | Desert wash | NW 2 | Shadscale scrub | Silty clay | 55 | 5 | 40 | 769 |
| 6 | Fan | Level | Creosote bush scrub | Silty clay loam | 35 | 20 | 45 | 823 |
| 7 | Desert wash | Level | Cheesebush scrub | Loamy sand | 10 | 75 | 15 | 1143 |
| Power transmission line - 1933 | | | | | | | | |
| 1 | Rocky hill | N 19 | Creosote bush scrub | Silty clay loam | 30 | 20 | 30 | 286 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Power transmission line - 1933 contd | | | | | | | | |
| 2 | Fan | Level | Salt bush scrub | Coarse sand | | 90 | 10 | 622 |
| 3 | Desert wash | E 6 | Cheesebush scrub | Silty clay | 45 | 10 | 45 | 610 |
| 4 | Playa | Level | Salt bush scrub | Silty clay | 40 | 10 | 50 | 488 |
| 5 | Desert wash | E 6 | Salt bush scrub | Sandy loam | | 60 | 40 | 609 |
| 6 | Dissected fan | SW 7 | Creosote bush scrub | Sandy clay loam | 50 | 30 | 20 | 914 |
| Power transmission line - 1944 contd | | | | | | | | |
| 1 | Hill | Level | Creosote bush scrub | Sandy loam | | 60 | 40 | 744 |
| 2 | Playa | N 1 | Salt bush scrub | Silt loam | 20 | 30 | 50 | 533 |
| 3 | Alkali sink | Level | Salt bush scrub | Silty clay | 60 | | 40 | 530 |
| 4 | Fan | Level | Salt bush scrub | Coarse sand | | 90 | 10 | 622 |
| 5 | Fan | Level | Joshua tree woodland | Clay loam | 40 | 20 | 40 | 1158 |
| 6 | Sand covered fan | Level | Creosote bush scrub | Sandy loam | | 60 | 40 | 768 |
| 7 | Pavements fan | Level | Creosote bush scrub | Silt loam | 20 | 30 | 50 | 762 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Power transmission line - 1944 contd | | | | | | | | |
| 8 | Fan | SW 5 | Creosote bush scrub | Loam | 40 | 10 | 50 | 561 |
| 9 | Rocky hill | E 16 | Creosote bush scrub | Loam | 40 | 10 | 50 | 930 |
| 10 | Dissected fan | SW 7 | Creosote bush scrub | Sandy clay loam | 50 | 30 | 20 | 914 |
| Power transmission line - 1952 | | | | | | | | |
| 1 | Fan | Level | Joshua tree woodland | Silty clay loam | 40 | 10 | 60 | 945 |
| 2 | Sand covered fan | N 7 | Creosote bush scrub | Silty clay | 50 | 5 | 45 | 975 |
| 3 | Dissected fan | E 9 | Creosote bush scrub | Loam | 20 | 50 | 30 | 853 |
| 4 | Desert wash | E 4 | Salt bush scrub | Silty clay loam | 30 | 20 | 50 | 795 |
| 5 | Desert wash | E 4 | Cheesebush scrub | Sandy loam | | 60 | 40 | 832 |
| 6 | Hill | E 28 | Desert holly scrub | Silty clay | 35 | 15 | 50 | 762 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Power transmission line - 1952 contd | | | | | | | | |
| 7 | Rocky Hill | N 12 | Creosote bush scrub | Loam | 20 | 50 | 30 | 823 |
| 8 | Desert wash | E 5 | Salt bush scrub | Sandy loam | 10 | 60 | 30 | 777 |
| Power transmission line - 1968 | | | | | | | | |
| 1 | Fan | Level | Joshua tree woodland | Silty loam | 20 | 20 | 60 | 990 |
| 2 | Fan | Level | Joshua tree woodland | Clay | 60 | 10 | 30 | 1219 |
| 3 | Riverwash | N 3 | Salt bush scrub | Clay loam | 35 | 30 | 35 | 1006 |
| 4 | Sand covered fan | N 4 | Creosote bush scrub | Silty clay | 40 | 15 | 45 | 1006 |
| 5 | Desert wash | Level | Cheesebush scrub | Loamy sand | 10 | 75 | 15 | 1143 |
| Power transmission line - 1969 | | | | | | | | |
| 1 | Desert wash | E 4 | Creosote bush scrub | Silt loam | 20 | 10 | 70 | 441 |
| 2 | Riverwash | NW 4 | Creosote bush scrub | Loamy sand | | 80 | 20 | 426 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Power transmission line - 1969 contd | | | | | | | | |
| 3 | Fan | Level | Creosote bush scrub | Silty loam | 10 | 60 | 30 | 441 |
| 4 | Rocky hill | SW 6 | Creosote bush scrub | Sandy loam | | 60 | 40 | 673 |
| 5 | Sand covered fan | Level | Creosote bush scrub | Coarse sand | | 90 | 10 | 826 |
| 6 | Fan | Level | Creosote bush scrub | Silty clay loam | 40 | 10 | 50 | 808 |
| 7 | Pavement dissected fan | E 4 | Mountain scrub | Silty clay | 50 | | 50 | 899 |
| Power transmisssion line - 1977 | | | | | | | | |
| 1 | Fan | Level | Creosote bush scrub | Silty loam | 40 | 5 | 55 | 731 |
| 2 | Fan | E 5 | Joshua tree woodland | Clay | 60 | 10 | 30 | 945 |
| 3 | Sand covered fan | W 13 | Creosote bush scrub | Silty clay loam | 40 | 10 | 50 | 731 |
| 4 | Desert wash | Level | Salt bush scrub | Silty clay | 45 | 10 | 45 | 768 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Power transmission line - 1977 ocntd | | | | | | | | |
| 5 | Dry playa | Level | Salt bush scrub | Silty loam | 10 | 30 | 60 | 728 |
| 6 | Fan, dissec-ted pavement | Level | Creosote bush scrub | Silty loam | 70 | | 30 | 603 |
| Los Angeles Aqueduct - 1913 | | | | | | | | |
| 1 | Desert wash | E 2.5 | Croesote bush scrub | Sandy loam | 10 | 75 | 15 | 1037 |
| 2 | Fan | Level | Creosote bush scrub | Silty loam | 20 | 20 | 60 | 951 |
| 3 | Hill | S 23.5 | Creosote bush scrub | Clay | 80 | | 20 | 937 |
| 4 | Fan | SE 8 | Creosote bush scrub | Silty clay loam | 30 | 20 | 50 | 1037 |
| 5 | Sand covered fan | Level | Cheesebush scrub | Sandy loam | 10 | 75 | 15 | 1037 |
| 6 | Fan | Level | Creosote bush scrub | Loamy sand | | 80 | 20 | 991 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Los Angeles Aqueduct - 1913 | | | | | | | | |
| 7 | Fan | E 6 | Cheesebush scrub | Silty loam | 20 | 20 | 60 | 982 |
| 8 | Desert wash | E 7 | Cheesebush scrub | Silty loam | 20 | 30 | 50 | 969 |
| 9 | Desert wash | E 4 | Cheesebush scrub | Silty loam | | 60 | 40 | 893 |
| 10 | Hill | E 36 | Creosote bush scrub | Loamy sand | | 80 | 20 | 965 |
| 11 | Dissected fan | N 19 | Creosote bush scrub | Sandy loam | 10 | 75 | 15 | 1006 |
| Los Angeles Aqueduct - 1970 | | | | | | | | |
| 1 | Desert wash | E 2.5 | Creosote bush scrub | Sandy loam | 10 | 75 | 15 | 1037 |
| 2 | Rocky hill | E 13 | Desert holly | Sandy loam | | 70 | 30 | 768 |
| 3 | Dissected fan | E 13 | Creosote bush scrub | Sandy loam | | 70 | 30 | 768 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Los Angeles Aqueduct - 1970 | | | | | | | | |
| 4 | Rocky hill | S 25 | Creosote bush scrub | Loam | 20 | 40 | 40 | 890 |
| 5 | Hill | S 4 | Creosote bush scrub | Silty loam | 5 | 35 | 60 | 1018 |
| 6 | Fan | SE 8 | Creosote bush scrub | Silty clay loam | 30 | 20 | 50 | 1037 |
| 7 | Sand covered fan | Level | Cheesebush scrub | Sandy loam | 10 | 75 | 15 | 1037 |
| 8 | Fan | Level | Joshua tree woodland | Loamy sand | | 80 | 20 | 991 |
| 9 | Fan | E 6 | Cheesebush scrub | Silty loam | 20 | 20 | 60 | 991 |
| 10 | Desert wash | E 3 | Cheesebush scrub | Sandy clay loam | 30 | 50 | 20 | 973 |
| 11 | Desert wash | E 7 | Creosote bush scrub | Silty loam | 20 | 30 | 50 | 969 |

Table 4 contd

| Study Areas | Topographic Location | Exposure Slope % | Community | Soil Class | Soil Texture % Clay | Sand | Silt | Elevation M |
|---|---|---|---|---|---|---|---|---|
| Los Angeles Aqueduct - 1970 contd | | | | | | | | |
| 12 | Desert wash | E 4 | Cheesebush scrub | Sandy loam | | 60 | 40 | 838 |
| 13 | Hill | E 10 | Creosote bush scrub | Silty clay | 30 | 15 | 55 | 793 |
| 14 | Hill | NE 18 | Creosote bush scrub | Loamy sand | | 80 | 20 | 768 |
| 15 | Dissected fan | N 19 | Creosote bush scrub | Sandy loam | 10 | 75 | 15 | 1006 |

Table 5: Summary of mean soil penetrometer readings from control and right-of-way sites as a measure of soil compaction due to utility construction. N = number of soil probes; decreasing N and/or high compaction figures at shallow depths in disturbed sites indicates possible soil compaction.

| Utility | Construction date | Depth cm | Sites: Control N | Control Pressure $K_g/cm^2$ | Right-of-way N | Right-of-way Pressure $K_g/cm^2$ |
|---|---|---|---|---|---|---|
| Pipeline | 1956 | | | | | |
| | | 5 | 7 | 11.14 | 22 | 13.55 |
| | | 10 | 7 | 29.00 | 22 | 30.77 |
| | | 15 | 6 | 38.50 | 12 | 35.58 |
| | | 20 | 6 | 38.33 | 8 | 30.50 |
| | | 25 | 5 | 34.40 | 5 | 26.20 |
| | | 30 | 4 | 31.25 | 4 | 26.25 |
| | | 35 | 4 | 36.75 | 3 | 25.33 |
| | | 40 | 3 | 36.00 | 3 | 30.00 |
| | | 45 | 3 | 37.00 | 3 | 35.33 |
| | | 50 | 3 | 48.33 | 2 | 24.50 |
| | | 55 | 1 | | 2 | 25.50 |
| | | 60 | 1 | | 2 | 25.50 |
| | | 65 | 1 | | 1 | |
| | | 70 | 1 | | 1 | |
| | | 75 | 1 | | 1 | |
| | | 80 | 1 | | 1 | |
| | | | | | 1 | |

Table 5 contd

| Utility | Construction date | Depth cm | Sites: Control N | Control Pressure $K_g/cm^2$ | Right-of-way N | Right-of-way Pressure $K_g/cm^2$ |
|---|---|---|---|---|---|---|
| Powerline | 1924 | 5 | 13 | 8.46 | 31 | 23.77 |
| | | 10 | 13 | 21.62 | 22 | 38.55 |
| | | 15 | 13 | 24.38 | 2 | 37.50 |
| | | 20 | 13 | 28.69 | | |
| | | 25 | 9 | 37.11 | | |
| | | 30 | 4 | 29.50 | | |
| | | 35 | 4 | 30.75 | | |
| | | 40 | 4 | 36.75 | | |
| | | 45 | 3 | 30.33 | | |
| | | 50 | 3 | 36.00 | | |
| | | 55 | 3 | 42.00 | | |
| | | 60 | 2 | 33.00 | | |
| | | 65 | 2 | 37.00 | | |
| | | 70 | 2 | 67.50 | | |
| Powerline | 1933 | 5 | 11 | 5.73 | 13 | 7.85 |
| | | 10 | 11 | 12.91 | 13 | 15.77 |
| | | 15 | 9 | 39.33 | 13 | 21.08 |
| | | 20 | 6 | 21.33 | 11 | 17.82 |
| | | 25 | 5 | 18.40 | 10 | 15.40 |
| | | 30 | 5 | 15.00 | 10 | 20.00 |
| | | 35 | 5 | 13.60 | 9 | 15.78 |
| | | 40 | 5 | 14.00 | 9 | 22.33 |
| | | 45 | 4 | 11.25 | 9 | 16.89 |
| | | 50 | 4 | 16.00 | 9 | 17.22 |

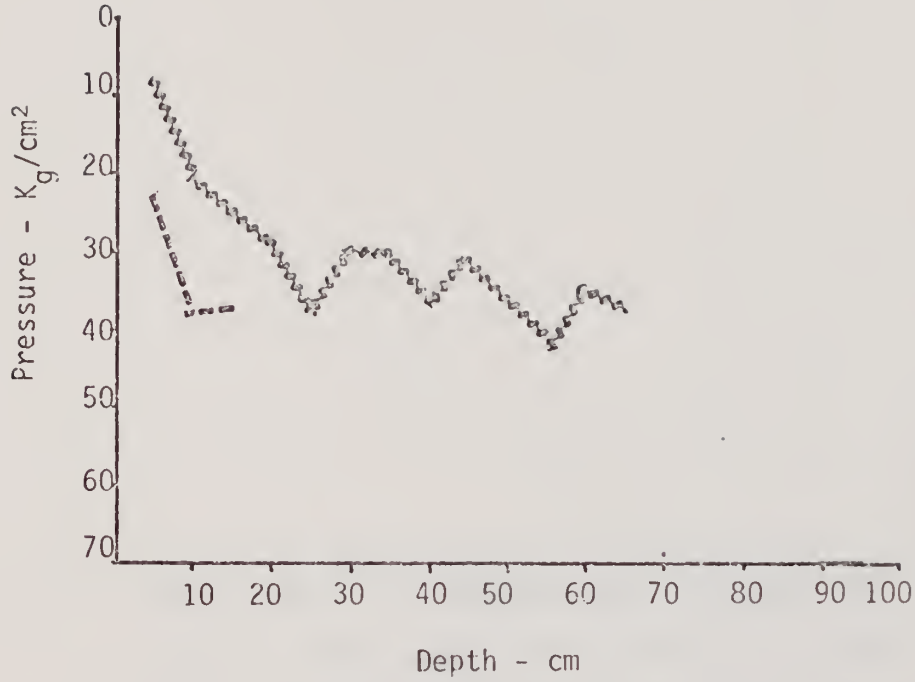
Table 5 contd

| Utility | Construction date | Depth cm | Sites: Control N | Control Pressure $K_g/cm^2$ | Right-of-way N | Right-of-way Pressure $K_g/cm^2$ |
|---|---|---|---|---|---|---|
| Powerline | 1933 contd | | | | | |
| | | 55 | 4 | 18.00 | 7 | 24.29 |
| | | 60 | 4 | 18.50 | 5 | 22.20 |
| | | 65 | 4 | 22.50 | 4 | 22.50 |
| | | 70 | 4 | 31.25 | 4 | 24.00 |
| | | 75 | 3 | 30.00 | 2 | 30.00 |
| | | 80 | 2 | 37.50 | 2 | 30.00 |
| | | 85 | 1 | 28.00 | 2 | 31.00 |
| | | 90 | 1 | 32.00 | 2 | 29.00 |
| Powerline | 1944 | | | | | |
| | | 5 | 11 | 10.73 | 29 | 21.90 |
| | | 10 | 11 | 25.36 | 16 | 34.94 |
| | | 15 | 10 | 35.30 | 6 | 31.33 |
| | | 20 | 6 | 32.67 | 4 | 44.00 |
| | | 25 | 6 | 42.00 | | |
| | | 30 | 3 | 39.33 | | |
| | | 35 | 3 | 40.67 | | |
| | | 40 | 2 | 51.00 | | |
| Powerline | 1977a | | | | | |
| | | 5 | 76 | 3.67 | 86 | 12.23 |
| | | 10 | 76 | 8.57 | 77 | 21.47 |
| | | 15 | 65 | 13.36 | 46 | 27.01 |

Table 5 contd

| Utility | Construction date | Depth cm | Sites: Control N | Control Pressure $K_g/cm^2$ | Right-of-way N | Right-of-way Pressure $K_g/cm^2$ |
|---|---|---|---|---|---|---|
| Powerline | 1977a contd | | | | | |
| | | 20 | 58 | 13.68 | 33 | 35.46 |
| | | 25 | 38 | 30.63 | 14 | 30.79 |
| | | 30 | 31 | 24.78 | 8 | 28.63 |
| | | 35 | 24 | 29.88 | 7 | 28.43 |
| | | 40 | 23 | 26.17 | 7 | 30.14 |
| | | 45 | 20 | 29.37 | 6 | 28.66 |
| | | 50 | 13 | 30.50 | 6 | 35.17 |
| | | 55 | 8 | 42.13 | 4 | 44.00 |
| | | 60 | 5 | 54.00 | 4 | 28.75 |
| | | 65 | 2 | 45.00 | | |
| | | 70 | 1 | 50.00 | | |
| Powerline | 1977b | | | | | |
| | | 5 | 25 | 11.32 | 5 | 23.35 |
| | | 10 | 16 | 28.44 | 10 | 31.88 |
| | | 15 | 3 | 33.33 | 15 | 28.33 |
| | | 20 | 2 | 33.50 | 20 | 45.00 |
| | | 25 | 1 | 27.00 | | |
| | | 30 | 1 | 40.00 | | |

Fig. 3: Line graph of soil penetrometer reading from table 5. Upper = 1924 powerline, Nov. 29, 1978; Lower = 1933 powerline, Nov. 29, 1978; right-of-way (▬▬▬); control (▬▬▬).


0
10
20
30
40
50
60
70
Pressure - $K_g/cm^2$
10 20 30 40 50 60 70 80 90 100
Depth - cm

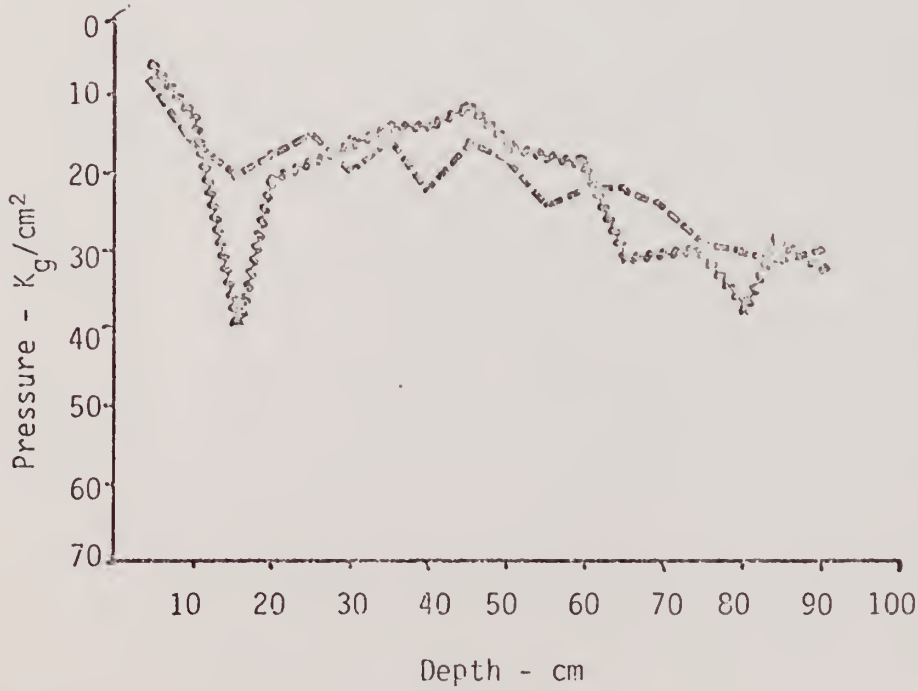
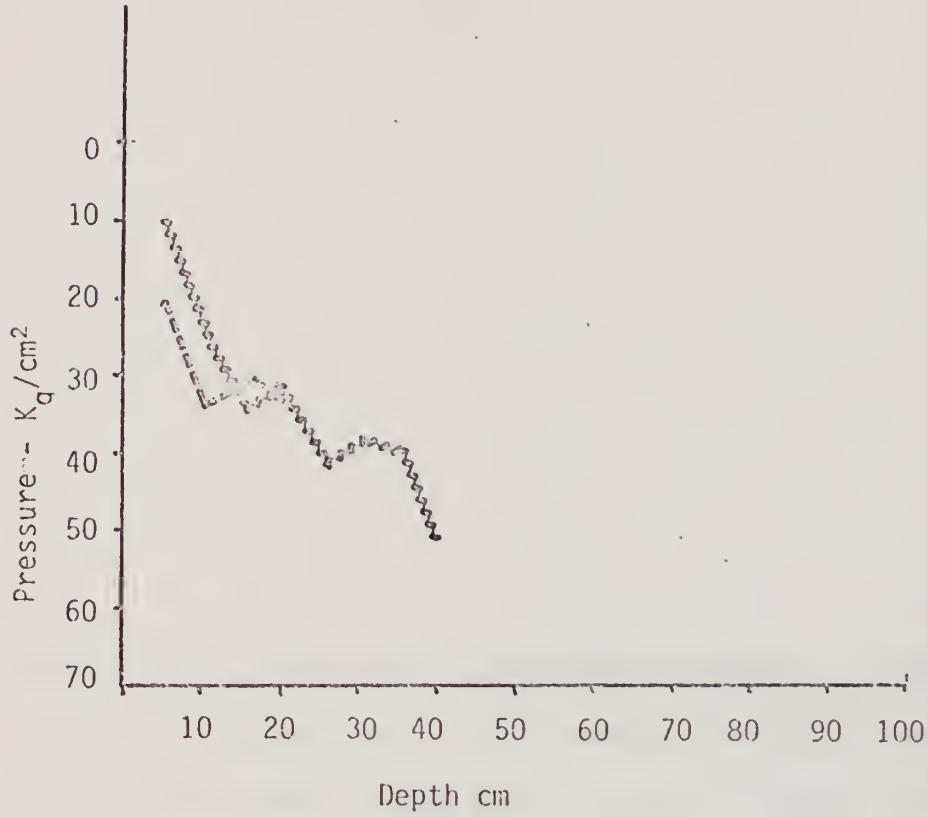

0
10
20
30
40
50
60
70
Pressure - $K_g/cm^2$
10 20 30 40 50 60 70 80 90 100
Depth - cm

Fig. 4: Line graph of soil penetrometer readings from table 5. Upper graph 1944 powerline, Nov. 29, 1978; Lower graph = 1977 powerline, Aug. 22, 1978; right-of-way (_____); control (_____).


0
10
20
30
40
50
60
70
Pressure - $K_g/cm^2$
10 20 30 40 50 60 70 80 90 100
Depth cm

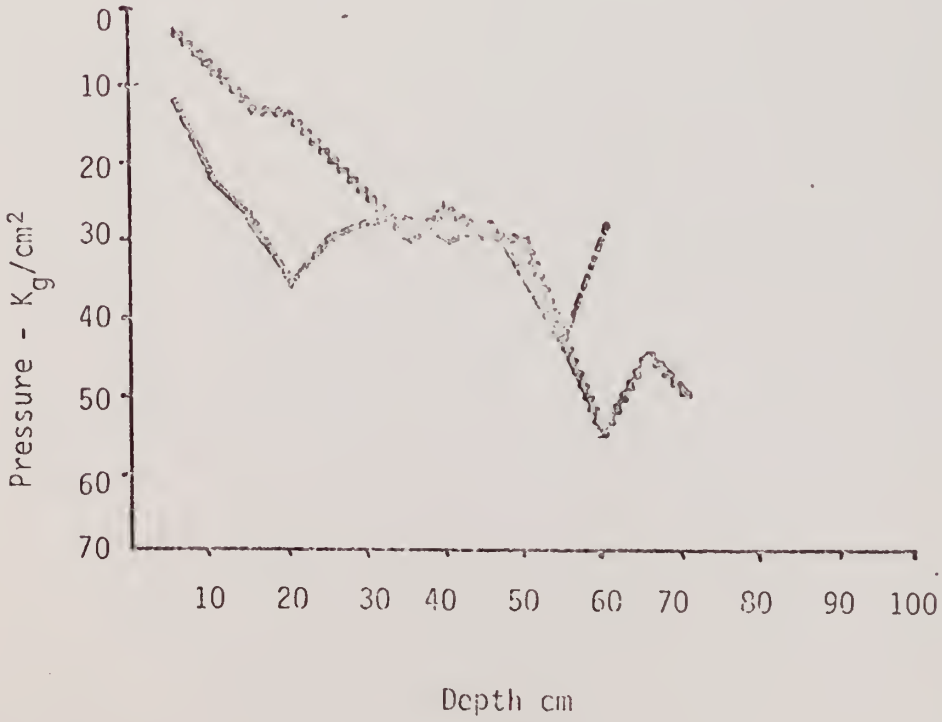
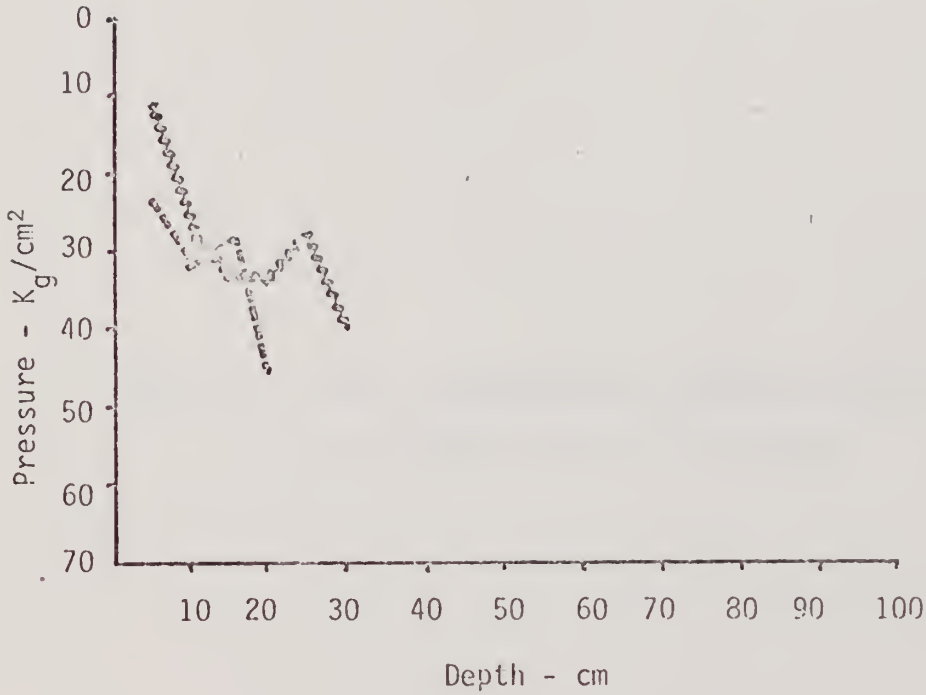

0
10
20
30
40
50
60
70
Pressure - $K_g/cm^2$
10 20 30 40 50 60 70 80 90 100
Depth cm

Fig. 5: Line graph of soil penetrometer readings of table 5. Upper graph = 1977 powerline, Nov. 29, 1978; Lower graph = 1956 pipeline Aug. 22, 1978; right-of-way (▪▪▪▪▪▪); control (∿∿∿∿∿).


0
10
20
30
40
50
60
70
Pressure - $K_g/cm^2$
10 20 30 40 50 60 70 80 90 100
Depth - cm

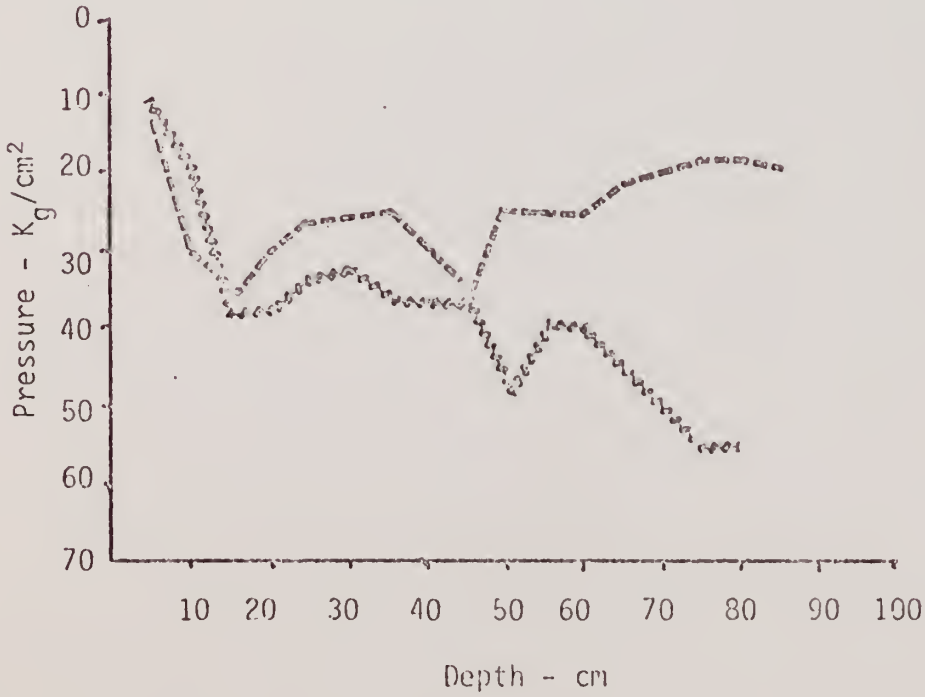

0
10
20
30
40
50
60
70
Pressure - $K_g/cm^2$
10 20 30 40 50 60 70 80 90 100
Depth - cm

Fig 5

Table 6: Author reference for community classification of the Mohave Desert, California.

| Community | Reference |
|---|---|
| Cheesebush scrub | Johnson, 1976 |
| Creosote bush scrub | Thorne, 1976 |
| Desert holly scrub | Johnson, 1976 |
| Dune sand plant | Thorne, 1976 |
| Joshua tree woodland | Vasek, 1977 |
| Salt bush scrub | Vasek, 1977 |
| Semi-stem succulent (mixed mountain scrub-other authors) | Thorne, 1976 |
| Shadscale scrub | Vasek, 1977 |

Table 7: Perennial plant species classified by density values and relative age span for the project reference transects. LL = long lived species; SL = short lived species.

| Family/Species | Density Value $K_g/m^3$ | Relative Age |
|---|---|---|
| Asteraceae | | |
| Acamptopappus sphaerocephalus (Harv. & Gray) Gray | 3 | SL |
| Ambrosia dumosa (Gray) Payne | 4 | LL |
| Baileya pauciradiata Harv. & Gray | 2 | SL |
| Bebbia juncea (Benth) Greene | 2 | SL |
| Brickellia arguta Rob. | 2 | SL |
| Chrysothamnus nauseosus (Pall. ) Britton Ssp. mohavensis (Greene) Hall & Clem. | 3 | LL |
| Chrysothamnus paniculatus (Gray) Hall | 3 | LL |
| Dyssodia cooperi Gray | 3 | SL |
| Dyssodia thurberi (Gray) Nels. | 3 | SL |
| Encelia farinosa Gray ex Torr. | 2 | LL |
| Encelia virginensis A. Nels. | 2 | LL |
| Gutierrezia microcephala (DC.) Gray | 3 | SL |
| Haplopappus acradenius (Greene) Blake | 3 | SL |
| Haplopappus cuneatus Gray | 3 | SL |
| Haplopappus cooperi (Gray) Hall | 3 | SL |
| Hymenoclea salsola T. & G. | 2 | SL |
| Lepidospartum squamatum (Gray) Gray | 3 | SL |
| Machaeranthera tortifolia (Gray) Crong. & Keck. | 3 | SL |
| Senecio douglasii DC. | 3 | SL |
| Stephanomeria pauciflora (Torr.) Nutt. | 2 | SL |
| Tetradymia comosa Gray | 4 | LL |
| Tetradymia spinosa H & A | 4 | LL |

Table 7 contd

| Family/Species | Density Value $K_g/m^3$ | Relative Age |
|---|---|---|
| *Tetradymia stenolepis* Greene | 4 | LL |
| Agavaceae | | |
| *Yucca brevifolia* Engelm. | 13 | LL |
| *Yucca schidigera* Roege ex Ortigies | 13 | LL |
| Bignoniaceae | | |
| *Chilopsis linearis* (Cav.) Sweet | 1 | LL |
| Brassicaceae | | |
| *Lepldium fremontii* Wats | 3 | SL |
| Cactaceae | | |
| *Echinocactus polycephalus* Engelm & Bigel | 93 ~~692~~ | LL |
| *Ferocactus* acanthodes ~~acantnes~~ (Lem.) Britton & Rose | 93 ~~692~~ | LL |
| *Mammillaria tetrancistra* Engelm | | LL |
| *Opuntia basilaris* Engelm & Bigel | 78 | LL |
| *Opuntia echinocarpa* Engelm & Bigel | 9 | LL |
| *Opuntia ramossima* Engelm | 9 | LL |
| Capparaceae | | |
| *Isomeris arborea* Nutt. | 6 | LL |
| Chenopodiaceae | | |
| *Atriplex canescens* (Pursh) Nutt. | 5 | LL |
| *Atriplex confertifolia* (Torr. & Frem.) Wats | 8 | LL |

Table 7 contd

| Family/Species | Density Value $K_g/m^3$ | Relative Age |
|---|---|---|
| *Atriplex hymenelytra* (Torr.) Wats. | 8 | LL |
| *Atriplex ploycarpa* (Torr.) Wats. | 5 | LL |
| *Atriplex spinefera* Macbr. | 5 | LL |
| *Ceratoides lanatum* (Pursh) T. Howell | 5 | LL |
| *Grayia spinosa* (Hook) Mog. | 6 | LL |
| *Sueda torreyiana* Wats. | 1 | LL |
| Ephedraceae | | |
| *Ephedra californicus* Muell-Arg. | 6 | LL |
| *Ephedra nevadensis* Wats. | 6 | LL |
| *Ephedra viridis* Cov. | 6 | LL |
| Euphorbiaceae | | |
| *Croton californicus* Muell-Arg. | 1 | SL |
| *Stillingia linearifolia* Wats. | 1 | SL |
| Fabaceae | | |
| *Acaccia greggii* Gray | 1 | LL |
| *Cassia armata* Wats. | 4 | LL |
| *Cercidium floridum* (Benth) Wats. Benth. | 1 | LL |
| *Dalea arborescens* Torr. ex Gray | 6 | LL |
| *Dalea californica* Wats. | 6 | LL |
| *Dalea emoryi* Gray | 6 | LL |
| *Dalea spinosa* Gray | 6 | LL |
| *Prosopis glandulosa* Torr. var *torreyana* (L. Benson) M.C. Jtn. | 1 | LL |

Table 7 contd

| Family/Species | Density Value $K_g/m^3$ | Relative Age |
|---|---|---|
| Hydrophyllaceae | | |
| *Eriodyction trichocalyx* Heller Ssp. *lanatum* (Brand) Munz. | 3 | SL |
| Krameriaceae | | |
| *Krameria parvifolia* Benth, Var. *imparata* Macbr. | 2 | LL |
| Lamiaceae | | |
| *Salvia dorii* (Kell.) Abrams | 3 | LL |
| *Salazaria mexicana* Torr. | 4 | LL |
| Loasaceae | | |
| *Petalonyx thurberi* G. | 3 | SL |
| Poaceae | | |
| *Airistida fendleriana* Steude | 2.5 | SL |
| *Hilaria jamesii* (Thurb.) Benth. ex Scribn. | 2.5 | SL |
| *Hilaria rigida* (Thurb.) Benth. ex Scribn. | 3.7 | LL |
| *Muhlenbergia potteri* Scribn. | 2.5 | SL |
| *Oryzopsis hymenoides* (R. & S.) Ricker | 2.5 | SL |
| *Panicum urvilleanum* Kunth. | 2.5 | SL |
| *Stipa speciosa* Trin. & Rupr. | 2.5 | SL |
| Polemoniaceae | | |
| *Gilia densifolium* (Benth.) Mason Ssp. *mohavensis* (Craig) Mason | 1 | SL |

Table 7 contd

| Family/Species | Density Value $K_g/m^3$ | Relative Age |
|---|---|---|
| Polygonaceae | | |
| *Eriogonum fasciculatum* Benth | 3 | SL |
| *Erigonum heerimannii* Dur. & Hilg. | 3 | SL |
| *Eriogonum inflatum* Torr. & Frem. | .5 | SL |
| Rosaceae | | |
| *Coleogyne ramosissima* Torr. | 7 | LL |
| *Fallugia paradaxa* (D. Don) Endl. | 7 | LL |
| *Prunus fasciculata* (Torr.) Gray | 5 | LL |
| *Purshia glandulosa* Curran | 7 | LL |
| Rutaceae | | |
| *Thamnosma montana* Torr. & Frem. | 7 | LL |
| Solanaceae | | |
| *Lycium andersoni* | 22 | LL |
| *Lycium cooperi* Gray | 22 | LL |
| Zygophyllaceae | | |
| *Larrea tridentata* (Sesse & Moc ex DC.) Cov. | 2.5 | LL |

Table 8: Analysis of perennial vegetation along a natural gas pipeline constructed in 1956. Tr = transect; A = control; B = berm; C = trench; D = roadedge; PR = productivity ratio (Test ÷ Control); % change (Control - Test ÷ control) is computed for biomass values only.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 3 | 1.00 | | 25 | | .6296 | | .0092 | | | |
| B | 3 | 1.60 | 1.60 | 25 | 1.00 | 1.1104 | 1.76 | .0147 | 1.60 | 60 | |
| C | 3 | .88 | .88 | 18 | .72 | .4703 | .75 | .0070 | .76 | | 24 |
| D | 2 | .59 | .59 | 6 | .64 | .5061 | .80 | .0066 | .72 | | 28 |
| Study area 2 | | | | | | | | | | | |
| A | 11 | 7.32 | | 39 | | 4.4873 | | .0855 | | | |
| B | 6 | 2.48 | .34 | 314 | 8.05 | 3.0009 | .67 | .0513 | .60 | | 40 |
| C | 4 | .94 | .13 | 168 | 4.31 | 1.7028 | .38 | .0064 | .07 | | 92 |
| D | 2 | 1.76 | .24 | 246 | 6.31 | 2.345 | .52 | .0485 | .56 | | 43 |
| Study area 3 | | | | | | | | | | | |
| A | 16 | 5.32 | | 176 | | 5.3308 | | .0837 | | | |
| B | 10 | 1.61 | .30 | 43 | .24 | 1.2810 | .24 | .0185 | .22 | | 78 |
| C | 12 | 4.04 | .76 | 79 | .45 | 3.0944 | .58 | .0470 | .56 | | 44 |
| D | 9 | 5.31 | 1.00 | 101 | .57 | 3.6785 | .69 | .0655 | .78 | | 22 |

Table 8 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 7 | 4.90 | | 107 | | 3.2959 | | .0642 | | | |
| B | 6 | 2.88 | .58 | 78 | .72 | 2.1871 | .66 | .0296 | .46 | | 54 |
| C | 7 | 4.06 | .82 | 109 | 1.02 | 2.0899 | .63 | .0235 | .37 | | 63 |
| D | 6 | 2.26 | .46 | 71 | .66 | 2.5836 | .78 | .0359 | .56 | | 44 |
| Study area 5 | | | | | | | | | | | |
| A | 5 | 5.32 | | 135 | | 3.7723 | | .0785 | | | |
| B | 9 | 4.05 | .76 | 145 | 1.07 | 3.2151 | .85 | .0684 | .85 | | 13 |
| C | 7 | 3.65 | .68 | 134 | .99 | 2.3230 | .62 | .0460 | .59 | | 41 |
| D | 8 | 8.02 | 1.51 | 106 | .78 | 7.6596 | 2.03 | .1180 | 1.50 | 50 | |
| Study area 6 | | | | | | | | | | | |
| A | 4 | 4.91 | | 81 | | 4.2845 | | .0641 | | | |
| B | 7 | 3.69 | .75 | 94 | 1.16 | 2.8970 | .67 | .0475 | .74 | | 26 |
| C | 6 | 3.90 | .79 | 90 | 1.11 | 1.559 | .36 | .0283 | .44 | | 56 |
| D | 5 | 5.40 | 1.10 | 99 | 1.22 | 3.9612 | .92 | .0586 | .91 | | 09 |

Table 8 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 10 | 4.21 | | 53 | | 4.3287 | | .0667 | | | |
| B | 10 | 3.14 | .75 | 63 | 1.19 | 2.6764 | .62 | .0371 | .56 | | 44 |
| C | 6 | 1.30 | .31 | 21 | .40 | 1.2345 | .28 | .0139 | .21 | | 79 |
| D | 7 | 2.15 | .51 | 56 | 1.06 | 2.1459 | .50 | .0315 | .47 | | 53 |
| Study area 8 | | | | | | | | | | | |
| A | 5 | 3.37 | | 178 | | 2.3271 | | .0428 | | | |
| B | 3 | 2.94 | .87 | 188 | 1.06 | 2.892 | 1.24 | .0543 | 1.27 | 27 | |
| C | 3 | 1.23 | .36 | 163 | .92 | 1.349 | .58 | .0280 | .65 | | 35 |
| D | 5 | 2.34 | .69 | 186 | 1.04 | 1.2634 | .54 | .0266 | .62 | | 38 |

Table 9: Analysis of perennial vegetation along a natural gas pipeline constructed in 1960. Headings as in table 8.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 3 | 2.40 | | 33 | | 2.4919 | | .0319 | | | |
| B | 2 | .37 | .15 | 32 | .97 | .1792 | .07 | .0024 | .07 | | 92 |
| C | 4 | 1.07 | .44 | 37 | 1.12 | .789 | .32 | .0054 | .17 | | 83 |
| D | 3 | 1.19 | .50 | 24 | .73 | .8144 | .33 | .0096 | .30 | | 70 |
| Study area 2 | | | | | | | | | | | |
| A | 3 | 4.47 | | 28 | | 4.8303 | | .0818 | | | |
| B | 3 | .54 | .12 | 23 | .82 | .2942 | .06 | .0041 | .05 | | 94 |
| C | 3 | 1.84 | .41 | 54 | 1.93 | 1.2554 | .26 | .0162 | .20 | | 80 |
| D | 3 | .51 | .11 | 13 | .46 | .6244 | .13 | .0070 | .08 | | 91 |
| Study area 3 | | | | | | | | | | | |
| A | 16 | 4.68 | | 81 | | 3.1688 | | .0631 | | | |
| B | 9 | 1.85 | .39 | 32 | .39 | 1.2336 | .39 | .0158 | .25 | | 75 |
| C | 9 | 4.44 | .95 | 116 | 1.43 | 2.9177 | .92 | .0388 | .61 | | 38 |
| D | 5 | 1.43 | .30 | 47 | .58 | .8923 | .28 | .0146 | .23 | | 77 |

Table 9 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 6 | 2.96 | | 94 | | 1,999 | | .0668 | | | |
| B | 3 | 2.01 | .68 | 79 | .84 | 1.4521 | .73 | .0201 | .30 | | 70 |
| C | 3 | 3.30 | 1.11 | 75 | .80 | 2.2775 | 1.14 | .0368 | .55 | | 45 |
| D | 3 | 2.74 | .93 | 43 | .46 | 2.3475 | 1.174 | .0249 | .37 | | 63 |
| Study area 5 | | | | | | | | | | | |
| A | 14 | 4.83 | | 168 | | 3.2757 | | .2442 | | | |
| B | 8 | 2.61 | .54 | 149 | .89 | 1.8560 | .57 | .0342 | .14 | | 86 |
| C | 6 | 1.61 | .33 | 70 | .42 | .9000 | .27 | .0184 | .07 | | 92 |
| D | 5 | 1.36 | .28 | 126 | .75 | .7813 | .24 | .0117 | .05 | | 95 |
| Study area 6 | | | | | | | | | | | |
| A | 6 | 4.40 | | 94 | | 4.3951 | | .0433 | | | |
| B | 3 | 4.46 | 1.01 | 166 | 1.77 | 2.134 | .48 | .0329 | .76 | | 24 |
| C | 3 | 1.78 | .40 | 142 | 1.51 | .7531 | .17 | .0169 | .39 | | 61 |
| D | 4 | 4.72 | 1.07 | 96 | 1.02 | 2.6948 | .61 | .0436 | 1.01 | .7 | |

Table 10: Analysis of perennial vegetation along a natural gas pipeline constructed in 1963. Headings as in table 8. T = trace amount.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 3 | .17 | | 256 | | .1660 | | .0120 | | | |
| B | 2 | .04 | .23 | 31 | .12 | .1525 | .92 | .0004 | .03 | | 97 |
| C | 2 | T | | 8 | .03 | .0061 | .04 | .0001 | .01 | | 99 |
| D | 3 | .27 | 1.59 | 468 | 1.83 | .3464 | 2.09 | .0019 | .16 | | 81 |
| Study area 2 | | | | | | | | | | | |
| A | 3 | 1.08 | | 211 | | 1.2488 | | .0125 | | | |
| B | 3 | 2.79 | 2.58 | 172 | .81 | 2.4876 | 1.99 | .0359 | 2.87 | 187 | |
| C | 3 | 2.10 | 1.94 | 129 | .61 | 2.2446 | 1.80 | .0320 | 2.56 | 156 | |
| D | 3 | 1.51 | 1.40 | 150 | .71 | 1.7310 | 1.39 | .0088 | .70 | | 30 |
| Study area 3 | | | | | | | | | | | |
| A | 3 | 4.47 | | 86 | | 2.5512 | | .0516 | | | |
| B | 4 | 3.08 | .69 | 80 | .96 | 4.6247 | 1.81 | .0325 | .63 | | 37 |
| C | 3 | 1.54 | .34 | 95 | 1.10 | 1.4194 | .57 | .0225 | .44 | | 56 |
| D | 3 | 5.91 | 1.32 | 162 | 1.88 | 3.8926 | 1.53 | .0829 | 1.61 | 61 | |

Table 10ccondt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 3 | 4.66 | | 68 | | 4.9082 | | .1177 | | | |
| B | 4 | 5.99 | 1.28 | 54 | .79 | 6.2218 | 1.27 | .1585 | 1.35 | 34 | |
| C | 4 | 2.19 | .47 | 23 | .34 | .9746 | .20 | .0228 | .19 | | 81 |
| D | 2 | 1.29 | .28 | 28 | .41 | 1.5814 | .32 | .0320 | .27 | | 73 |
| Study area 5 | | | | | | | | | | | |
| A | 7 | 5.90 | | 156 | | 4.3978 | | .0561 | | | |
| B | 8 | 6.30 | 1.07 | 262 | 1.68 | 4.3575 | .99 | .0556 | .99 | | 01 |
| C | 5 | 3.29 | .56 | 190 | 1.22 | 2.4483 | .56 | .0271 | .48 | | 52 |
| D | 6 | 6.14 | 1.04 | 215 | 1.38 | 4.2489 | .97 | .0503 | .90 | | 10 |
| Study area 6 | | | | | | | | | | | |
| A | 2 | 2.39 | | 52 | | 2.1668 | | .0287 | | | |
| B | 2 | 2.14 | .89 | 95 | 1.83 | .6933 | .32 | .0138 | .64 | | 52 |
| C | 3 | 1.23 | .51 | 68 | 1.31 | .7595 | .35 | .0125 | .43 | | 56 |
| D | 2 | 2.67 | 1.12 | 54 | 1.04 | 1.8256 | .84 | .0325 | 1.18 | 13 | |

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 5 | 2.30 | | 28 | | 1.6654 | | .0202 | | | |
| B | 4 | 1.37 | .60 | 8 | .29 | .8965 | .54 | .0081 | .40 | | 60 |
| C | 3 | 1.65 | .72 | 5 | .18 | 1.9043 | 1.14 | .0227 | 1.19 | 12 | |
| D | 6 | 2.20 | .96 | 11 | .39 | 2.7256 | 1.64 | .0209 | 1.08 | 3 | |
| Study area 8 | | | | | | | | | | | |
| A | 5 | 4.59 | | 23 | | 3.1095 | | .0347 | | | |
| B | 3 | 3.10 | .69 | 27 | 1.17 | 2.5475 | .82 | .0255 | .73 | | 26 |
| C | 4 | 3.43 | .75 | 28 | 1.22 | 2.7148 | .87 | .0257 | .74 | | 30 |
| D | 5 | 2.08 | .45 | 36 | 1.56 | 1.1263 | .36 | .0104 | .30 | | 70 |

Table 11: Analysis of perennial vegetation along a petroleum products pipeline constructed in 1963. Headings as table 8.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 6 | 4.65 | | 39 | | 1.5064 | | .0698 | | | |
| B | 3 | 3.10 | .66 | 28 | .72 | 2.3750 | 1.58 | .0302 | .43 | | 57 |
| C | 5 | 4.15 | .89 | 31 | .79 | 3.6200 | 2.40 | .0442 | .63 | | 37 |
| D | 3 | 1.12 | .24 | 14 | .36 | 1.2570 | .83 | .0160 | .23 | | 77 |
| Study area 2 | | | | | | | | | | | |
| A | 5 | 5.08 | | 119 | | 3.4496 | | .0601 | | | |
| B | 4 | 2.91 | .57 | 85 | .71 | 1.4156 | .41 | .0183 | .30 | | 70 |
| C | 5 | 3.28 | .64 | 195 | 1.64 | 1.4295 | .41 | .0268 | .45 | | 55 |
| D | 4 | 2.59 | .51 | 44 | .37 | 1.440 | .42 | .0196 | .33 | | 67 |

Table 12: Analysis of perannial vegetation along a petroleum products pipeline constructed in 1970. Headings as in table 8.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 6 | 3.40 | | 21 | | 3.7717 | | .0551 | | | |
| B | 3 | .78 | .23 | 30 | 1.43 | .4014 | .11 | .0052 | .09 | | 91 |
| C | 4 | 1.79 | .53 | 50 | 2.38 | 1.1403 | .30 | .0129 | .23 | | 77 |
| D | 2 | .48 | .14 | 12 | .57 | .3063 | .08 | .0031 | .06 | | 94 |
| Study area 2 | | | | | | | | | | | |
| A | 5 | 3.05 | | 48 | | 3.063 | | .0590 | | | |
| B | 2 | .14 | .05 | 26 | .54 | .0685 | .02 | .0010 | .02 | | 98 |
| C | 2 | .12 | .04 | 28 | .58 | .1551 | .05 | .0010 | .02 | | 98 |
| D | 2 | .14 | .05 | 16 | .33 | .0707 | .02 | .0010 | .02 | | 98 |
| Study area 3 | | | | | | | | | | | |
| A | 4 | 4.53 | | 125 | | 3.0826 | | .0396 | | | |
| B | 1 | .13 | .03 | 68 | .54 | .0544 | .02 | .0013 | .03 | | 97 |
| C | 1 | .09 | .02 | 70 | .58 | .042 | .01 | .0010 | .02 | | 97 |
| D | 1 | .39 | .09 | 211 | 1.69 | 1.688 | .55 | .0422 | 1.07 | 9 | |

Table 12 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 4 | 2.40 | | 66 | | 2.5300 | | .0354 | | | |
| B | 4 | .77 | .32 | 33 | .50 | .4068 | .16 | .0053 | .15 | | 85 |
| C | 4 | .82 | .34 | 42 | .64 | .4620 | .18 | .0063 | .18 | | 82 |
| D | 5 | 1.26 | .53 | 51 | .32 | .6701 | .26 | .0095 | .26 | | 73 |
| Study area 5 | | | | | | | | | | | |
| A | 4 | 2.82 | | 48 | | 2.2837 | | .0478 | | | |
| B | 3 | 1.90 | .67 | 86 | 1.79 | .8431 | .37 | .0209 | .44 | | 56 |
| C | 3 | 1.56 | .55 | 32 | .66 | .8708 | .38 | .0217 | .45 | | 56 |
| D | 3 | 2.62 | .93 | 95 | 1.98 | 2.7216 | 1.19 | .0621 | 1.30 | 30 | |
| Study area 6 | | | | | | | | | | | |
| A | 6 | 5.44 | | 127 | | 4.3851 | | .0722 | | | |
| B | 2 | .37 | .07 | 18 | .14 | .2011 | .05 | .0048 | .07 | | 93 |
| C | 2 | .17 | .03 | 10 | .08 | .1180 | .03 | .0029 | .04 | | 96 |
| D | 3 | 1.93 | .35 | 68 | .54 | 1.7043 | .39 | .0291 | .40 | | 60 |

Table 12 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 2 | 2.23 | | 24 | | 2.1654 | | .0318 | | | |
| B | 1 | .09 | .04 | 4 | .17 | .0356 | .02 | .0004 | .01 | | 99 |
| C | 4 | .13 | .06 | 9 | .38 | .0889 | .04 | .0012 | .04 | | 96 |
| D | 4 | 1.12 | .50 | 32 | 1.33 | .7681 | .35 | .0096 | .30 | | 70 |

Table 13: Analysis of perennial vegetation along a petrolum products pipeline constructed in 1973. Headings as in table 8. T = trace amount.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass K$_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 2 | 1.54 | | 38 | | 1.6568 | | .0232 | | | |
| B | 2 | .42 | .27 | 78 | 2.05 | .5484 | .33 | .0081 | .35 | | 65 |
| C | 1 | T | | 2 | .05 | .0024 | .001 | .0001 | .004 | | 100 |
| D | 3 | .87 | .56 | 37 | .97 | .7519 | .45 | .0113 | .49 | | 51 |
| Study area 2 | | | | | | | | | | | |
| A | 3 | 2.97 | | 62 | | 2.1689 | | .0346 | | | |
| B | 4 | .82 | .28 | 52 | .84 | .5983 | .28 | .0082 | .24 | | 76 |
| C | 7 | 1.35 | .45 | 140 | 2.26 | .7497 | .35 | .0116 | .34 | | 66 |
| D | 6 | 1.09 | .37 | 33 | .53 | .5471 | .25 | .0092 | .27 | | 73 |
| Study area 3 | | | | | | | | | | | |
| A | 7 | 3.98 | | 47 | | 3.5398 | | .0381 | | | |
| B | 5 | 1.49 | .37 | 34 | .72 | .9275 | .26 | .0156 | .41 | | 59 |
| C | 6 | 1.36 | .34 | 33 | .70 | .8172 | .23 | .0122 | .32 | | 70 |
| D | 7 | 2.73 | .56 | 68 | 1.45 | 1.8999 | .54 | .0242 | .63 | | 36 |

Table 13cooondt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 2 | 2.29 | | 17 | | 2.5588 | | .0623 | | | |
| B | 1 | .74 | .32 | 8 | .47 | .5728 | .22 | .0143 | .23 | | 77 |
| C | 2 | 1.13 | .49 | 31 | 1.82 | .6466 | .25 | .0060 | .10 | | 90 |
| D | 3 | 3.69 | 1.61 | 41 | 2.41 | 2.1060 | .82 | .0432 | .69 | | 31 |
| Study area 5 | | | | | | | | | | | |
| A | 2 | 2.95 | | 37 | | 1.3387 | | .0198 | | | |
| B | 4 | 1.26 | .43 | 70 | 1.89 | 1.2459 | .93 | .0193 | .97 | | 2 |
| C | 5 | 2.12 | .72 | 107 | 2.89 | .8503 | .63 | .0131 | .66 | | 34 |
| D | 3 | 3.85 | 1.30 | 86 | 2.32 | 2.4005 | 1.79 | .0428 | 2.16 | 116 | |
| Study area 6 | | | | | | | | | | | |
| A | 3 | 3.28 | | 53 | | 2.4063 | | .3348 | | | |
| B | 3 | .19 | .06 | 8 | .15 | .0927 | .04 | .0026 | .01 | | 99 |
| C | 6 | .58 | .18 | 21 | .40 | .2174 | .09 | .0056 | .02 | | 98 |
| D | 2 | .44 | .13 | 15 | .28 | .1835 | .08 | .0083 | .02 | | 97 |

Table 14: Analysis of perennial vegetation along a power transmission line constructed in 1924. Tr = transect; A = control; B = wire; C = pylon; D = roadedge; PR = productivity ratio (test ÷ control); % change (control - test ÷ control) is computed for biomass values only.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 5 | 4.73 | | 126 | | 2.2687 | | .0462 | | | |
| B | 4 | 3.77 | .80 | 125 | .99 | 1.987 | .87 | .0389 | .84 | | 16 |
| C | 7 | 5.42 | 1.15 | 175 | 1.39 | 3.1207 | 1.37 | .0563 | 1.22 | 22 | |
| D | 4 | 7.46 | 1.58 | 171 | 1.36 | 4.3415 | 1.91 | .0771 | 1.67 | 67 | |
| Study area 2 | | | | | | | | | | | |
| A | 7 | 7.05 | | 268 | | 5.8735 | | .1068 | | | |
| B | 12 | 10.60 | 1.50 | 191 | .71 | 8.944 | 1.52 | .0905 | .84 | | 15 |
| C | 10 | 5.65 | .80 | 390 | 1.45 | 5.2307 | .89 | .1128 | 1.06 | 6 | |
| D | 8 | 11.66 | 1.65 | 159 | .59 | 7.9741 | 1.36 | .1181 | 1.11 | 11 | |
| Study area 3 | | | | | | | | | | | |
| A | 13 | 6.19 | | 107 | | 4.2515 | | .0800 | | | |
| B | 11 | 6.54 | 1.06 | 117 | 1.09 | 4.0233 | .95 | .0617 | .77 | | 23 |
| C | 13 | 3.33 | .54 | 98 | .92 | 2.4335 | .57 | .0448 | .56 | | 44 |
| D | 10 | 2.09 | .34 | 59 | .55 | 1.3984 | .33 | .0258 | .32 | | 68 |

Table 14 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 6 | 5.84 | | 48 | | 6.9869 | | .1542 | | | |
| B | 4 | 1.21 | .21 | 40 | .83 | 2.3208 | .33 | .0425 | .28 | | 72 |
| C | 7 | 5.09 | .87 | 44 | .92 | 4.2476 | .61 | .0653 | .42 | | 58 |
| D | 4 | 3.06 | .52 | 34 | .71 | 3.4368 | .49 | .0699 | .45 | | 55 |
| Study area 5 | | | | | | | | | | | |
| A | 13 | 3.54 | | 58 | | 3.9015 | | .0656 | | | |
| B | 7 | 1.81 | .51 | 49 | .84 | .9233 | .24 | .0283 | .43 | | 57 |
| C | 2 | 1.77 | .50 | 47 | .81 | .0712 | .02 | .0120 | .20 | | 80 |
| D | 2 | 2.88 | .81 | 46 | .79 | .0654 | .02 | .0192 | .29 | | 71 |
| Study area 6 | | | | | | | | | | | |
| A | 4 | 2.15 | | 32 | | 2.4602 | | .0237 | | | |
| B | 3 | 1.48 | .69 | 96 | .30 | .8005 | .32 | .0289 | 1.21 | 22 | |
| C | 4 | 3.10 | 1.81 | 39 | 1.22 | 2.3381 | .95 | .0110 | .46 | | 54 |
| D | 3 | 2.24 | 1.04 | 39 | 1.22 | 1.5805 | .64 | .0187 | .79 | | 21 |

Table 14ccondt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 6 | 3.84 | | 38 | | 3.3843 | | .0470 | | | |
| B | 5 | 2.65 | .69 | 48 | 1.26 | 1.8545 | .55 | .0243 | .52 | | 48 |
| C | 6 | 6.83 | 1.78 | 98 | 2.58 | 5.4553 | 1.61 | .0644 | 1.37 | 37 | |
| D | 6 | 2.67 | .69 | 32 | .84 | 2.1945 | .65 | .0320 | .68 | | 32 |

Table 15: Analysis of perennial vegetation along a power transmission line constructed in 1933. Headings as in table 14.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 4 | 2.52 | | 78 | | 2.4229 | | .0352 | | | |
| B | 5 | 1.36 | .54 | 87 | 1.11 | 1.6398 | .68 | .0283 | .80 | | 20 |
| C | 4 | 3.25 | 1.29 | 147 | 1.88 | 2.5530 | 1.05 | .0457 | 1.30 | 30 | |
| D | 5 | 2.60 | 1.03 | 117 | 1.50 | 2.1570 | .89 | .0335 | .95 | | 5 |
| Study area 2 | | | | | | | | | | | |
| A | 4 | 7.65 | | 106 | | 8.0825 | | .1433 | | | |
| B | 4 | 3.37 | .44 | 57 | .54 | 2.3182 | .29 | .0442 | .31 | | 68 |
| C | 5 | 5.31 | .69 | 85 | .80 | 3.0142 | .37 | .0507 | .35 | | 65 |
| D | 4 | 4.81 | .62 | 115 | 1.08 | 2.8340 | .35 | .0579 | .40 | | 60 |
| Study area 3 | | | | | | | | | | | |
| A | 7 | 3.98 | | 47 | | 3.5398 | | .0381 | | | |
| B | 7 | 5.08 | 1.27 | 50 | 1.06 | 4.2641 | 1.20 | .0635 | 1.67 | 66 | |
| C | | | | | | | | | | | |
| D | 5 | 2.00 | .50 | 25 | .53 | 1.5562 | .44 | .0241 | .63 | | 37 |

Table 15 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 3 | 2.96 | | 62 | | 2.1682 | | .0346 | | | |
| B | 2 | 2.08 | .70 | 35 | .56 | 1.5821 | .73 | .0249 | .72 | | 28 |
| C | 2 | 2.19 | .73 | 32 | .52 | 1.7450 | .80 | .0245 | .71 | | 29 |
| D | 3 | 2.36 | .79 | 54 | .87 | 1.5469 | .71 | .0240 | .69 | | 31 |
| Study area 5 | | | | | | | | | | | |
| A | 3 | 1.56 | | 55 | | .9275 | | .0190 | | | |
| B | 3 | 1.68 | 1.08 | 75 | 1.36 | 1.0078 | 1.09 | .01871 | .98 | | 1 |
| C | 3 | 1.98 | 1.27 | 113 | 2.05 | 1.1969 | 1.29 | .0223 | 1.17 | 17 | |
| D | 3 | 2.18 | 1.40 | 58 | 1.05 | 1.2642 | 1.36 | .0289 | 1.52 | 52 | |
| Study area 6 | | | | | | | | | | | |
| A | 6 | 4.25 | | 55 | | 3.7283 | | .0599 | | | |
| B | 8 | 7.61 | 1.79 | 76 | 1.38 | 7.0668 | 1.89 | .0984 | 1.64 | 64 | |
| C | 7 | 2.48 | .58 | 106 | 1.93 | 2.4866 | .67 | .0443 | .74 | | 26 |
| D | 9 | 4.23 | .99 | 59 | 1.07 | 3.5052 | .94 | .0528 | .88 | | 19 |

Table 15 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 2 | 2.29 | | 17 | | 2.5589 | | .0623 | | | |
| B | 1 | 1.78 | .78 | 162 | 9.53 | ..5670 | .22 | .0142 | .23 | | 77 |
| C | 1 | 1.26 | .55 | 106 | 6.23 | .3710 | .14 | .0093 | .15 | | 85 |
| D | 1 | 2.21 | .97 | 200 | 11.76 | .7000 | .27 | .0175 | .28 | | 72 |

Table 16: Analysis of perennial vegetation along a power transmission line constructed in 1944. Headings as in table 14.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 8 | 4.16 | | 59 | | 3.1655 | | .0778 | | | |
| B | 5 | 3.25 | .78 | 127 | 2.15 | 3.0380 | .96 | .0463 | .59 | | 40 |
| C | 6 | 4.10 | .99 | 56 | .95 | 2.7136 | .86 | .0463 | .59 | | 40 |
| D | 5 | 1.35 | .32 | 68 | 1.15 | .9924 | .31 | .0276 | .35 | | 64 |
| Study area 2 | | | | | | | | | | | |
| A | 3 | 1.35 | | 19 | | .8469 | | .0200 | | | |
| B | 3 | 1.71 | 1.27 | 25 | 1.31 | .9509 | 1.12 | .0223 | 1.11 | 12 | |
| C | 3 | 1.37 | 1.01 | 37 | 1.95 | .7144 | .84 | .0170 | .85 | | 15 |
| D | 2 | 1.78 | 1.32 | 14 | .74 | 1.1457 | 1.35 | .0286 | 1.43 | 19 | |
| Study area 3 | | | | | | | | | | | |
| A | 6 | 2.63 | | 66 | | 1.9649 | | .0446 | | | |
| B | 2 | 5.14 | 1.95 | 46 | .70 | 4.7510 | 2.42 | .0832 | 1.86 | 86 | |
| C | 2 | 10.02 | 3.81 | 69 | 1.04 | 8.3163 | 4.23 | .1914 | 4.29 | 329 | |
| D | 4 | 5.91 | 2.25 | 87 | 1.32 | 3.6807 | 1.87 | .0753 | 1.69 | 69 | |

Table 16 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 4 | 5.65 | | 106 | | 8.0825 | | .1433 | | | |
| B | 4 | 4.06 | .72 | 58 | .55 | 2.9872 | .37 | .0513 | .36 | | 64 |
| C | 5 | 2.86 | .51 | 34 | .32 | 2.9547 | .36 | .0497 | .34 | | 65 |
| D | 5 | 6.34 | 1.12 | 204 | 1.92 | 3.8827 | .48 | .0450 | .31 | | 69 |
| Study area 5 | | | | | | | | | | | |
| A | 9 | 4.50 | | 174 | | 3.8462 | | .0700 | | | |
| B | 10 | 8.97 | 1.99 | 205 | 1.18 | 7.0434 | 1.83 | .0917 | 1.31 | 31 | |
| C | 5 | 4.31 | .96 | 124 | .71 | 4.5149 | 1,17 | .0653 | .93 | | 7 |
| D | 7 | 9.08 | 2.02 | 117 | .67 | 10.6430 | 2.77 | .1611 | 2.30 | 130 | |
| Study area 6 | | | | | | | | | | | |
| A | 4 | 3.15 | | 78 | | 2.4630 | | .1199 | | | |
| B | 4 | 3.30 | 1.05 | 105 | 1.35 | 2.7668 | 1.12 | .0903 | .75 | | 25 |
| C | 6 | 3.49 | 1.11 | 136 | 1.74 | 2.6112 | 1.06 | .0738 | .61 | | 38 |
| D | 5 | 2.70 | .86 | 60 | .77 | 2.7812 | 1.13 | .0786 | .65 | | 34 |

Table 16 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 4 | 2.30 | | 41 | | 1.6453 | | .0270 | | | |
| B | 4 | 2.62 | 1.14 | 79 | 1.93 | 2.1530 | 1.31 | .0391 | 1.45 | 45 | |
| C | 2 | 2.74 | 1.19 | 59 | 1.44 | 1.4116 | .86 | .0346 | 1.28 | 28 | |
| D | 4 | 2.79 | 1.21 | 95 | 2.32 | 3.1153 | 1.89 | .0604 | 2.24 | 124 | |
| Study area 8 | | | | | | | | | | | |
| A | 2 | 2.06 | | 50 | | 1.0344 | | .0145 | | | |
| B | 3 | 1.70 | .82 | 199 | 3.98 | 1.4367 | 1.39 | .0271 | 1.87 | 87 | |
| C | 2 | 2.09 | 1.01 | 130 | 2.60 | 2.1786 | 2.11 | .0387 | 2.67 | 166 | |
| D | 5 | 3.47 | 1.68 | 247 | 4.94 | 3.8712 | 3.74 | .0733 | 5.05 | 405 | |
| Study area 9 | | | | | | | | | | | |
| A | 4 | 2.48 | | 38 | | 2.2359 | | .0610 | | | |
| B | 2 | 1.85 | .75 | 37 | .97 | 1.6126 | .73 | .0208 | .34 | | 66 |
| C | 3 | 1.80 | .72 | 48 | 1.26 | 1.5265 | .68 | .0201 | .32 | | 66 |
| D | 2 | 3.41 | 1.37 | 26 | .70 | 4.7661 | 2.13 | .0606 | .99 | | 1 |

Table 16 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 10 | | | | | | | | | | | |
| A | 9 | 6.57 | | 134 | | 5.1809 | | .0987 | | | |
| B | 8 | 5.45 | .83 | 139 | 1.19 | 4.1405 | .80 | .0698 | .71 | | 29 |
| C | 9 | 3.36 | .51 | 112 | .84 | 2.7809 | .54 | .0532 | .53 | | 46 |
| D | 7 | 3.28 | .50 | 66 | .49 | 2.5662 | .49 | .0377 | .39 | | 62 |

Table 17: Analysis of perennial vegetation along a power transmission line constructed in 1952. Headings as in table 14.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 8 | 10.28 | | 59 | | 7.9003 | | .1127 | | | |
| B | 7 | 9.12 | .89 | 96 | 1.63 | 6.3673 | .81 | .0914 | .81 | | 19 |
| C | 9 | 7.09 | .69 | 67 | 1.13 | 4.9415 | .62 | .0816 | .72 | | 28 |
| D | 9 | 3.75 | .36 | 60 | 1.02 | 2.2005 | .28 | .0484 | .43 | | 57 |
| Study area 2 | | | | | | | | | | | |
| A | 9 | 4.85 | | 298 | | 3.4575 | | .0474 | | | |
| B | 9 | 5.08 | 1.05 | 243 | .81 | 2.2026 | .63 | .0408 | .86 | | 57 |
| C | 8 | 4.35 | .90 | 173 | .58 | 1.7695 | .51 | .0287 | .60 | | 39 |
| D | 8 | 3.78 | .78 | 131 | .44 | 2.5081 | .72 | .0370 | .78 | | 30 |
| Study area 3 | | | | | | | | | | | |
| A | 6 | 6.79 | | 105 | | 6.6897 | | .1154 | | | |
| B | 3 | 3.87 | .60 | 103 | .98 | 3.3543 | .50 | .0487 | .42 | | 58 |
| C | 6 | 3.38 | .50 | 89 | .85 | 3.0231 | .45 | .0416 | .36 | | 64 |
| D | 5 | 4.59 | .68 | 158 | 1.50 | 3.8436 | .57 | .0612 | .53 | | 50 |

Table 17 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 5 | 5.60 | | 85 | | 5.1423 | | .1080 | | | |
| B | 6 | 7.71 | 1.38 | 76 | .89 | 7.5382 | 1.46 | .1415 | 1.31 | 31 | |
| C | 6 | 3.23 | .58 | 63 | .74 | 3.0004 | .58 | .1415 | 1.31 | 31 | |
| D | 5 | 2.57 | .46 | 45 | .53 | 2.2340 | .43 | .0434 | .40 | | 60 |
| Study area 5 | | | | | | | | | | | |
| A | 4 | 5.59 | | 75 | | 4.6750 | | .0657 | | | |
| B | 6 | 5.16 | .92 | 73 | .97 | 3.8128 | .81 | .0593 | .90 | | 10 |
| C | 6 | 3.94 | .70 | 55 | .73 | 4.2593 | .91 | .0620 | .94 | | 6 |
| D | 6 | 3.13 | .56 | 68 | .91 | 1.6653 | .36 | .0230 | .35 | | 64 |
| Study area 6 | | | | | | | | | | | |
| A | 6 | 5.27 | | 150 | | 1.8327 | | .0741 | | | |
| B | 3 | 4.35 | .82 | 166 | 1.11 | 2.8530 | 1.56 | .0799 | 1.08 | 8 | |
| C | 4 | 1.38 | .26 | 50 | .33 | .5681 | .31 | .0200 | .27 | | 73 |
| D | 3 | 3.66 | .69 | 200 | 1.33 | 1.7750 | .97 | .0516 | .70 | | 30 |

Table 17 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 6 | 4.91 | | 132 | | 4.0880 | | .0743 | | | |
| B | 5 | 5.63 | 1.15 | 87 | .66 | 3.2373 | .79 | .0510 | .69 | | 31 |
| C | 3 | 2.70 | .55 | 90 | .68 | 2.7999 | .68 | .0430 | .58 | | 42 |
| D | 3 | 5.87 | 1.19 | 143 | 1.08 | 3.7796 | .92 | .0564 | .76 | | 24 |
| Study area 8 | | | | | | | | | | | |
| A | 2 | 6.64 | | 63 | | 7.1829 | | .1685 | | | |
| B | 2 | 6.15 | .93 | 61 | .97 | 8.9136 | 1.24 | .1476 | .88 | | 12 |
| C | 2 | 4.03 | .61 | 40 | .63 | 3.4417 | .48 | .0850 | .50 | | 50 |
| D | 2 | 4.59 | .69 | 39 | .61 | 3.9350 | .55 | .0961 | .57 | | 43 |

Table 18: Analysis of perennial vegetation along a power transmission line constructed in 1968. Headings as in table 14.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 11 | 7.30 | | 37 | | 3.8708 | | .0852 | | | |
| B | 11 | 3.92 | .54 | 60 | 1.62 | 2.7854 | .72 | .1139 | 1.34 | 34 | |
| C | 7 | 5.20 | .71 | 82 | 2.22 | 3.7207 | .96 | .0594 | .70 | | 30 |
| D | 8 | 5.65 | .77 | 123 | 3.32 | 3.6965 | .95 | .1292 | 1.52 | 52 | |
| Study area 2 | | | | | | | | | | | |
| A | 8 | 3.81 | | 115 | | 2.7990 | | .0491 | | | |
| B | 8 | 3.43 | .90 | 104 | .90 | 2.1354 | .76 | .0540 | 1.10 | 10 | |
| C | 5 | 2.25 | .59 | 73 | .63 | .8958 | .32 | .0178 | .36 | | 64 |
| D | 9 | 4.60 | 1.21 | 152 | 1.32 | 2.1630 | .77 | .0397 | .81 | | 19 |
| Study area 3 | | | | | | | | | | | |
| A | 6 | 5.84 | | 66 | | 6.9935 | | .1542 | | | |
| B | 10 | 4.69 | .80 | 60 | .91 | 4.6296 | .66 | .1016 | .66 | | 34 |
| C | 6 | 11.14 | 1.91 | 88 | 1.33 | 8.994 | 1.29 | .1888 | 1.22 | 22 | |
| D | 4 | 3.06 | .52 | 34 | .51 | 3.4201 | .49 | .0699 | .45 | | 55 |

Table 18 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 13 | 6.19 | | 107 | | 4.5724 | | .0800 | | | |
| B | 9 | 6.20 | 1.002 | 117 | 1.09 | 4.6796 | 1.02 | .0727 | .91 | | 9 |
| C | 8 | 4.85 | .78 | 91 | .85 | 2.7936 | .61 | .0460 | .58 | | 42 |
| D | 10 | 2.09 | .34 | 59 | .55 | 1.3984 | .31 | .0258 | .32 | | 68 |
| Study area 5 | | | | | | | | | | | |
| A | 10 | 4.21 | | 53 | | 4.3587 | | .0667 | | | |
| B | 7 | 3.87 | .92 | 70 | 1.32 | 3.4775 | .80 | .0573 | .86 | | 14 |
| C | 6 | 1.98 | .47 | 35 | .66 | 1.9956 | .46 | .0437 | .65 | | 34 |
| D | 7 | 2.15 | .51 | 56 | 1.06 | 2.1459 | .49 | .0315 | .47 | | 53 |

Table 19: Analysis of perennial vegetation along a power transmission line constructed in 1969. Headings as in table 14.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 3 | 4.52 | | 33 | | 4.6708 | | .0582 | | | |
| B | 4 | 1.64 | .36 | 29 | .88 | 1.7852 | .38 | .0228 | .39 | | 61 |
| C | 4 | 2.24 | .50 | 123 | 3.73 | 2.4025 | .51 | .0262 | .45 | | 55 |
| D | 3 | 1.19 | .26 | 24 | .73 | .8144 | .17 | .0095 | .16 | | 84 |
| Study area 2 | | | | | | | | | | | |
| A | 3 | 4.47 | | 28 | | 4.8303 | | .0590 | | | |
| B | 3 | 2.01 | .50 | 32 | 1.14 | 1.8696 | .39 | .0246 | .42 | | 58 |
| C | 4 | 1.44 | .10 | 136 | 4.86 | .7299 | .15 | .0209 | .35 | | 65 |
| D | 3 | .51 | .11 | 13 | .46 | .3634 | .07 | .0060 | .10 | | 90 |
| Study area 3 | | | | | | | | | | | |
| A | 4 | 8.29 | | 115 | | 8.3595 | | .1072 | | | |
| B | 3 | 7.49 | .90 | 166 | 1.44 | 6.7904 | .81 | .0909 | .85 | | 15 |
| C | 2 | 10.62 | 1.28 | 259 | 2.25 | 4.3145 | .52 | .0752 | .70 | | 30 |
| D | 4 | 9.43 | 1.14 | 129 | 1.12 | 4.2036 | .50 | .0674 | .63 | | 33 |

Table 19 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 3 | 1.86 | | 98 | | 2.4847 | | .0325 | | | |
| B | 3 | 1.66 | .89 | 144 | 1.47 | 2.8132 | 1.13 | .0368 | 1.13 | 13 | |
| C | 3 | 2.72 | 1.46 | 122 | 1.24 | 2.1677 | .87 | .0281 | .86 | | 14 |
| D | 3 | 2.27 | 1.22 | 213 | 2.17 | 3.1828 | 1.28 | .0499 | 1.53 | 53 | |
| Study area 5 | | | | | | | | | | | |
| A | 8 | 4.60 | | 124 | | 2.7722 | | .0642 | | | |
| B | 5 | 4.19 | .91 | 154 | 1.24 | 2.946 | 1.06 | .1363 | 2.12 | 112 | |
| C | 4 | 4.93 | 1.07 | 148 | 1.19 | 3.3672 | 1.21 | .1233 | 1.92 | 92 | |
| D | 5 | 6.43 | 1.40 | 187 | 1.51 | 5.8704 | 2.12 | .1617 | 2.51 | 143 | |
| Study area 6 | | | | | | | | | | | |
| A | 6 | 4.40 | | 94 | | 4.3952 | | .0681 | | | |
| B | 4 | 2.25 | .51 | 69 | .73 | 2.0528 | .47 | .0301 | .44 | | 56 |
| C | 3 | 2.69 | .61 | 67 | .71 | 2.4327 | .55 | .0344 | .50 | | 49 |
| D | 4 | 4.72 | 1.07 | 96 | 1.02 | 2.7148 | .62 | .0436 | .64 | | 36 |

Table 19 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 14 | 4.83 | | 168 | | 3.2757 | | .2442 | | | |
| B | 16 | 5.46 | 1.13 | 171 | 1.02 | 4.3050 | 1.31 | .2812 | 1.15 | 15 | |
| C | 5 | 1.13 | .23 | 65 | .39 | .6564 | .20 | .0085 | .03 | | 96 |
| D | 5 | 1.36 | .28 | 126 | .75 | .7813 | .23 | .0117 | .05 | | 95 |

Table 20: Analysis of perennial vegetation along a power transmission line constructed in 1977. Headings as in table 14.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 3 | 2.81 | | 43 | | 2.483 | | .0578 | | | |
| B | 5 | 1.50 | .53 | 104 | 2.42 | 1.3981 | .56 | .0414 | .72 | | 16 |
| C | 6 | 1.25 | .44 | 28 | .65 | 1.0112 | .41 | .0207 | .36 | | 64 |
| D | 6 | 2.80 | 1.00 | 66 | 1.53 | 1.6911 | .68 | .0447 | .77 | | 23 |
| Study area 2 | | | | | | | | | | | |
| A | 5 | 3.44 | | 109 | | 3.2159 | | .0423 | | | |
| B | 5 | 4.01 | 1.16 | 236 | 2.17 | 3.6301 | 1.13 | .0558 | 1.32 | 32 | |
| C | 5 | 1.48 | .43 | 69 | .63 | .8594 | ..27 | .0119 | .28 | | 72 |
| D | 6 | 6.89 | 2.00 | 275 | 2.52 | 8.6169 | 2.68 | .1251 | 2.96 | 196 | |
| Study area 3 | | | | | | | | | | | |
| A | 7 | 4.94 | | 129 | | 4.1131 | | .1041 | | | |
| B | 7 | 1.47 | ..30 | 119 | .92 | 1.2101 | .29 | .0796 | .76 | | 23 |
| C | 4 | .56 | .11 | 26 | .20 | .3914 | .09 | .0315 | .30 | | 70 |
| D | 6 | 2.99 | .60 | 89 | .69 | 2.7205 | .66 | .0634 | .61 | | 39 |

Table 20 condt

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 9 | 4.62 | | 48 | | 5.1857 | | .0839 | | | |
| B | 9 | 3.98 | .86 | 76 | 1.58 | 3.4404 | .66 | .0720 | .86 | | 14 |
| C | 6 | .90 | .19 | 52 | 1.08 | .5676 | .11 | .0131 | .16 | | 84 |
| D | 9 | 4.34 | .94 | 59 | 1.23 | 2.1779 | .61 | .0698 | .83 | | 17 |
| Study area 5 | | | | | | | | | | | |
| A | 4 | 5.53 | | 65 | | 3.8261 | | .0759 | | | |
| B | 3 | 3.87 | .70 | 62 | .95 | 2.1382 | .56 | .0480 | .63 | | 37 |
| C | 9 | 2.40 | .43 | 48 | .74 | 1.3257 | .35 | .0327 | .43 | | 57 |
| D | 5 | 4.40 | .80 | 101 | 1.55 | 2.4966 | .65 | .0578 | .76 | | 24 |
| Study area 6 | | | | | | | | | | | |
| A | 1 | 2.10 | | 25 | | 2.1925 | | .0274 | | | |
| B | 1 | 1.40 | .67 | 27 | 1.08 | 1.0476 | .48 | .0131 | .48 | | 52 |
| C | 2 | 2.59 | 1.23 | 92 | 3.68 | 1.5000 | .68 | .0195 | .71 | | 29 |
| D | 1 | 1.03 | .49 | 31 | 1.24 | .5239 | .24 | .0065 | .24 | | 76 |

Table 21: Analysis of perennial vegetation along the Los Angeles aqueduct constructed in 1913. tr = transect; A = control; B = right of way; C = roadedge; PR = productivity ratio (test ÷ control); % change (control - test ÷ control) is computed for biomass values only.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | Pr | Volume m$^3$/200m$^2$ | Pr | Biomass $K_g/m^2$ | Pr | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 6 | 7.85 | | 163 | | 6.1041 | | .0950 | | | |
| B | 6 | 3.53 | .45 | 167 | 1.02 | 2.4810 | .41 | .0372 | .39 | | 61 |
| C | 5 | 2.93 | .37 | 51 | .31 | 2.4251 | .40 | .0425 | .45 | | 55 |
| Study area 2 | | | | | | | | | | | |
| A | 7 | 6.21 | | 242 | | 5.3360 | | .0776 | | | |
| B | 4 | 8.24 | 1.33 | 172 | .71 | 5.3192 | 1.00 | .0795 | 1.02 | 4 | |
| C | 3 | 3.72 | .60 | 202 | .83 | 1.8023 | .34 | .0527 | .68 | | 32 |
| Study area 3 | | | | | | | | | | | |
| A | 8 | 8.07 | | 297 | | 6.3866 | | .0825 | | | |
| B | 7 | 3.18 | .39 | 119 | .40 | 2.2537 | .35 | .0339 | .41 | | 59 |
| C | 8 | 2.74 | .34 | 288 | .97 | 1.2641 | .20 | .0246 | .30 | | 70 |
| Study area 4 | | | | | | | | | | | |
| A | 10 | 13.16 | | 89 | | 6.9609 | | .0973 | | | |
| B | 4 | 10.86 | .83 | 170 | 1.91 | 7.9450 | 1.14 | .0116 | .12 | | 88 |
| C | 3 | 12.56 | .95 | 135 | 1.52 | 10.8809 | 1.56 | .1632 | 1.68 | 68 | |

Table 21 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 5 | | | | | | | | | | | |
| A | 10 | 5.87 | | 539 | | 4.0619 | | .0735 | | | |
| B | 6 | 9.56 | 1.63 | 512 | .95 | 6.6702 | 1.64 | .1000 | 1.36 | 36 | |
| C | 5 | 18.94 | 3.23 | 250 | .46 | 12.5851 | 3.10 | .1905 | 2.59 | 159 | |
| Study area 6 | | | | | | | | | | | |
| A | 9 | 9.91 | | 110 | | 8.1120 | | .1423 | | | |
| B | 8 | 16.02 | 1.62 | 108 | .98 | 9.1944 | 1.13 | .0117 | .08 | | 92 |
| C | 4 | 6.03 | .61 | 66 | .60 | 5.4334 | .67 | .0795 | .56 | | 44 |
| Study area 7 | | | | | | | | | | | |
| A | 6 | 5.29 | | 206 | | 3.0756 | | .0338 | | | |
| B | 7 | 11.09 | 2.10 | 154 | .75 | 8.9803 | 2.92 | .1270 | 3.76 | 276 | |
| C | 4 | 6.63 | 1.25 | 280 | 1.36 | .4323 | .14 | .0378 | 1.12 | 12 | |

Table 21 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 8 | | | | | | | | | | | |
| A | 11 | 5.80 | | 169 | | 3.4115 | | .0645 | | | |
| B | 9 | 4.09 | .71 | 141 | .83 | 3.3881 | .99 | .0421 | .65 | | 35 |
| C | 10 | 4.99 | .86 | 159 | .94 | 4.1070 | 1.20 | .0578 | .90 | | 10 |
| Study area 9 | | | | | | | | | | | |
| A | 12 | 5.30 | | 141 | | 3.1880 | | .0524 | | | |
| B | 5 | 6.75 | 1.27 | 111 | .79 | 5.7954 | 1.82 | .1085 | 2.07 | 107 | |
| C | 6 | 8.97 | 1.69 | 169 | 1.20 | 7.1783 | 2.25 | .1348 | 2.57 | 157 | |
| Study area 10 | | | | | | | | | | | |
| A | 15 | 6.90 | | 150 | | 4.8180 | | .0789 | | | |
| B | 10 | 1.79 | .26 | 103 | .69 | .8624 | .18 | .0106 | .13 | | 87 |
| C | 14 | 2.61 | .38 | 78 | .52 | 1.8593 | .39 | .0280 | .35 | | 65 |

Table 21 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 11 | | | | | | | | | | | |
| A | 12 | 3.01 | | 135 | | 1.7182 | | .0207 | | | |
| B | 11 | 3.49 | 1.16 | 174 | 1.29 | 1.8503 | 1.08 | .0230 | 1.11 | 11 | |
| C | 10 | 5.82 | 1.93 | 104 | .77 | 4.3358 | 2.52 | .0550 | 2.66 | 166 | |

Table 22: Analysis of vegetation along the Los Angeles aqueduct constructed in 1970. Headings as in table 21.

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 1 | | | | | | | | | | | |
| A | 5 | 3.59 | | 96 | | 4.1080 | | .0607 | | | |
| B | 5 | 3.71 | 1.03 | 112 | 1.17 | 2.1659 | .53 | .0326 | .54 | | 46 |
| C | 4 | 1.63 | .45 | 37 | .39 | 1.0965 | .27 | .0147 | .24 | | 76 |
| Study area 2 | | | | | | | | | | | |
| A | 6 | 5.27 | | 150 | | 2.4332 | | .0741 | | | |
| B | 3 | 1.83 | .35 | 111 | .74 | .6986 | .29 | .0273 | .37 | | 63 |
| C | 3 | 3.72 | .71 | 202 | 1.35 | 1.8023 | .74 | .0527 | .71 | | 29 |
| Study area 3 | | | | | | | | | | | |
| A | 5 | 5.97 | | 61 | | 6.7640 | | .0896 | | | |
| B | 8 | 3.35 | .56 | 111 | 1.82 | 2.1138 | .31 | .0369 | .41 | | 59 |
| C | 3 | 3.72 | .62 | 202 | 3.31 | 1.8023 | 7 | .0527 | .59 | | 41 |

Table 22 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 4 | | | | | | | | | | | |
| A | 7 | 4.52 | | 129 | | 2.7358 | | .0515 | | | |
| B | 9 | 1.16 | .26 | 41 | .32 | .9215 | .34 | .0106 | .21 | | 79 |
| C | 6 | 1.31 | .29 | 40 | .31 | .6735 | .25 | .0084 | .16 | | 84 |
| Study area 5 | | | | | | | | | | | |
| A | 8 | 4.91 | | 245 | | 3.3236 | | .0525 | | | |
| B | 3 | 1.26 | .26 | 34 | .14 | .8035 | .24 | .0083 | .16 | | 84 |
| C | 1 | .18 | .04 | 9 | .04 | .1116 | .03 | .0011 | .02 | | 98 |
| Study area 6 | | | | | | | | | | | |
| A | 10 | 13.16 | | 89 | | 6.9609 | | .0973 | | | |
| B | 1 | 4.61 | .35 | 63 | .71 | 2.5515 | .37 | .0383 | .39 | | 61 |
| C | 2 | 4.93 | .37 | 161 | 1.81 | 2.4920 | .36 | .0374 | .38 | | 62 |

Table 22 contd

| Tr | Number of species | Ground cover % | PR | Density #200/m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass K$_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 7 | | | | | | | | | | | |
| A | 10 | 5.87 | | 539 | | 4.0619 | | .0735 | | | |
| B | 8 | 6.65 | 1.13 | 147 | .27 | 5.6203 | 1.38 | .0845 | 1.15 | 15 | |
| C | 4 | 3.00 | .51 | 112 | .21 | 1.6477 | .41 | .0244 | .33 | | 67 |
| Study area 8 | | | | | | | | | | | |
| A | 9 | 9.91 | | 110 | | 8.1120 | | .1423 | | | |
| B | 6 | 4.33 | .44 | 39 | .35 | 3.6981 | .46 | .0496 | .35 | | 65 |
| C | 4 | 9.80 | .99 | 97 | .88 | 8.0714 | .99 | .1185 | .83 | | 17 |
| Study area 9 | | | | | | | | | | | |
| A | 6 | 5.29 | | 206 | | 3.0756 | | .0338 | | | |
| B | 3 | 1.33 | .25 | 64 | .31 | .7077 | .23 | .0082 | .24 | | 76 |
| C | 2 | .45 | .09 | 8 | .04 | .3431 | .11 | .0039 | .12 | | 88 |

Table 22 contd

| Tr | Number of species | Ground cover % | PR | Density #/200m$^2$ | PR | Volume m$^3$/200m$^2$ | PR | Biomass $K_g$/m$^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 10 | | | | | | | | | | | |
| A | 12 | 4.16 | | 78 | | 3.1304 | | .0714 | | | |
| B | 4 | 3.68 | .88 | 87 | 1.12 | 3.0322 | .97 | .0453 | .63 | | 37 |
| C | 4 | 2.05 | .49 | 45 | .58 | 1.2358 | .39 | .0181 | .25 | | 75 |
| Study area 11 | | | | | | | | | | | |
| A | 11 | 5.80 | | 169 | | 3.4115 | | .0645 | | | |
| B | 8 | 2.84 | .49 | 116 | .69 | 1.6407 | .48 | .0208 | .32 | | 68 |
| C | 5 | 5.23 | .90 | 59 | .35 | 4.2839 | 1.26 | .0629 | .98 | | 02 |
| Study area 12 | | | | | | | | | | | |
| A | 9 | 4.57 | | 98 | | 3.0714 | | .0498 | | | |
| B | 5 | 4.09 | .89 | 80 | .82 | 3.7367 | 1.22 | .0556 | 1.12 | 12 | |
| C | 6 | 3.24 | .71 | 138 | 1.41 | 2.1063 | .69 | .0295 | .59 | | 41 |

Table 22 contd

| Tr | Number of species | Ground Cover % | PR | Density #/200m² | PR | Volume m³/200m² | PR | Biomass $K_g/m^2$ | PR | % change + | % change - |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Study area 13 | | | | | | | | | | | |
| A | 4 | 5.51 | | 74 | | 4.6389 | | .0653 | | | |
| B | 6 | 1.98 | .36 | 103 | 1.39 | 1.0300 | .22 | .0121 | .19 | | 81 |
| C | 6 | 2.03 | .37 | 103 | 1.39 | .9463 | .20 | .0124 | .19 | | 81 |
| Study area 14 | | | | | | | | | | | |
| A | 5 | 5.48 | | 103 | | 3.5295 | | .0549 | | | |
| B | 2 | .89 | .16 | 5 | .05 | 1.0306 | .29 | .0103 | .19 | | 81 |
| C | 2 | .35 | .06 | 3 | ..03 | .3319 | .09 | .0034 | .06 | | 94 |
| Study area 15 | | | | | | | | | | | |
| A | 12 | 3.01 | | 135 | | 1.7182 | | .0267 | | | |
| B | 6 | 1.01 | .34 | 39 | .29 | .5311 | .31 | .0071 | .27 | | 73 |
| C | 7 | 1.06 | .35 | 30 | .22 | .8630 | .50 | .0122 | .46 | | 119 |

Table 23: Diversity measures computed from above ground plant biomass for pipelines by year of construction, transects, and study area. R = richness; (no. of species); Ec = equibility; V = evenness; DI = diversity index. Values omitted are due to either very low figures for richness or excessive dominance of one species in the transect, making calculations unreliable.

TRANSECTS

| Study Area | Control | | | | Berm | | | | Trench | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Natural Gas Pipeline - 1956 | | | | | | | | | | | | | | | | |
| 1 | 3 | 4.19 | .63 | .55 | 3 | 4.19 | .46 | .7 | 3 | 5.29 | .81 | .51 | 2 | 8.43 | | .12 |
| 2 | 11 | 25.29 | .2 | 5.92 | 6 | 3.8 | .17 | 1.19 | 4 | 2.66 | .32 | .22 | 2 | 1.08 | .49 | 1.42 |
| 3 | 16 | 16.91 | .82 | 10.48 | 10 | 19.36 | .68 | 1.97 | 12 | 16.95 | .83 | 5.76 | 9 | 9.71 | .52 | 4.02 |
| 4 | 7 | 6.7 | .53 | 4.58 | 6 | 6.22 | .76 | 2.75 | 7 | 6.65 | .43 | 1.42 | 6 | 6.52 | .36 | 1.86 |
| 5 | 13 | 23.9 | .38 | 5.25 | 7 | 9.89 | .35 | 1.68 | 2 | 1.69 | | .75 | 2 | 1.38 | .07 | .12 |
| 6 | 4 | 5.47 | .24 | .9 | 3 | 3.24 | .96 | .9 | 4 | 3.32 | .87 | 2.53 | 3 | 3.26 | .88 | 1.42 |
| 7 | 6 | 9.21 | .74 | 4.42 | 5 | 6.12 | .69 | 1.98 | 6 | 5.65 | .52 | 4.26 | 6 | 10.37 | .71 | 2.97 |
| 8 | 5 | 3.58 | .74 | 3.57 | 3 | 1.9 | .02 | .22 | 3 | 1.96 | .32 | .8 | 5 | 3.50 | .49 | 1.51 |
| Natural Gas Pipeline - 1960 | | | | | | | | | | | | | | | | |
| 1 | 3 | 3.57 | .01 | .41 | 2 | 2.37 | | .14 | 4 | 5.14 | | .54 | 3 | 4.29 | .42 | .43 |
| 2 | 3 | 3.89 | .31 | 2.94 | 3 | 6.45 | .89 | .32 | 3 | 2.84 | .86 | 1.2 | 3 | 7. | .7 | .48 |
| 3 | 16 | 26.37 | .83 | 8.26 | 9 | 21.09 | .67 | 1.68 | 9 | 9.17 | .38 | 2.32 | 5 | 6.16 | .42 | .82 |
| 4 | 6 | 5.73 | .69 | 5.69 | 3 | 2.44 | .72 | 1.25 | 3 | 2.52 | | 3.23 | 3 | 3.12 | .44 | 1.05 |
| 5 | 14 | 14.34 | .71 | 26.5 | 8 | 7.02 | .13 | .87 | 6 | 6.51 | .32 | .88 | 5 | 3.94 | .56 | .76 |

Table 23 contd

TRANSECTS

| Study Area | Control | | | | Berm | | | | Trench | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Natural Gas Pipeline - 1960 contd | | | | | | | | | | | | | | | | |
| 6 | 6 | 5.73 | .36 | 2.15 | 3 | 1.95 | .68 | 1.91 | 3 | 2.06 | .72 | 1.04 | 4 | 3.31 | .81 | 3.57 |
| Natural Gas Pipeline - 1963 | | | | | | | | | | | | | | | | |
| 1 | 3 | 1.77 | | .07 | 2 | | | | 2 | | | | 3 | 1.58 | | .01 |
| 2 | 3 | 1.74 | .74 | .79 | 3 | 1.9 | .47 | 1.48 | 3 | 2.09 | .93 | 2.54 | 3 | 1.91 | .07 | .07 |
| 3 | 3 | 2.38 | .87 | 1.68 | 4 | 3.53 | .72 | 2.42 | 3 | 2.26 | .35 | 1.68 | 3 | 1.94 | .42 | 3.04 |
| 4 | 3 | 2.59 | .21 | 2.63 | 4 | 4.19 | .41 | 7.52 | 4 | 6.81 | .53 | 1.49 | 2 | 2.2 | .36 | .82 |
| 5 | 7 | 5.78 | .51 | 3.79 | 8 | .58 | .64 | 4.73 | 5 | 2.89 | .21 | 1.32 | 6 | 4.25 | .59 | 3.59 |
| 6 | 2 | 1.69 | .44 | .8 | 2 | 1.4 | | .03 | 2 | 2.54 | .6 | .66 | 2 | 1.67 | .58 | 1.16 |
| 7 | 5 | 8.52 | .37 | 1.2 | 4 | | .85 | .78 | 3 | | | .22 | 6 | | | 1.88 |
| 8 | 5 | 9.97 | .39 | 2.23 | 3 | 3.98 | .58 | 1.41 | 4 | 5.96 | .6 | 1.76 | 5 | 7.12 | .77 | .95 |
| Petroleum Products Pipeline - 1963 | | | | | | | | | | | | | | | | |
| 1 | 6 | 9.03 | .65 | 5.97 | 3 | 3.88 | .36 | 1.19 | 5 | 7.9 | | .54 | 3 | 6.42 | | .19 |
| 2 | 5 | 4.1 | .75 | 5.10 | 4 | 3.48 | .76 | 1.43 | 5 | 3.49 | .73 | 2.21 | 4 | 4.65 | .78 | 1.59 |

Table 23 contd

TRANSECTS

| Study Area | Control | | | | Berm | | | | Trench | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Petroleum Products Pipeline - 1970 | | | | | | | | | | | | | | | | |
| 1 | 6 | 15.19 | .08 | 2.96 | 3 | 3.76 | .7 | .33 | 4 | 4.28 | .48 | .7 | 2 | 3.6 | | .02 |
| 2 | 5 | 6.08 | .59 | 4.27 | 2 | 2.57 | | .06 | 2 | 2.57 | | .02 | 2 | 2.57 | | .07 |
| 3 | 4 | 3.03 | .63 | 2.55 | 1 | | | | 1 | | | | 1 | | | |
| 4 | 4 | 3.83 | .69 | 1.9 | 4 | 4.87 | .53 | .32 | 4 | 3.67 | .49 | .59 | 5 | 5.92 | .57 | .66 |
| 5 | 4 | 4.44 | .69 | 3.47 | 3 | 1.7 | .04 | .32 | 3 | 3.61 | .25 | .31 | 3 | 2.3 | .69 | 3.69 |
| 6 | 6 | 5.1 | .71 | 6.19 | 2 | 2.67 | | .01 | 2 | 4.42 | | .001 | 3 | 2.59 | .82 | 2.05 |
| 7 | 2 | 2.38 | .39 | .89 | 1 | | | | 4 | 22.72 | .50 | .10 | 4 | 5.5 | .36 | .46 |
| Petroleum Products Pipeline - 1973 | | | | | | | | | | | | | | | | |
| 1 | 2 | 1.9 | .77 | 1.08 | 2 | 1.45 | | .47 | 1 | | | | 3 | 3.34 | .7 | .7 |
| 2 | 3 | 2.67 | .67 | 2.03 | 4 | 4.37 | .76 | .65 | 7 | 6.04 | .48 | .74 | 6 | 10.23 | .41 | .61 |
| 3 | 7 | 10.16 | .23 | 1.82 | 5 | 7.49 | .97 | 1.68 | 6 | 10.17 | .78 | 1.2 | 7 | 8.27 | .78 | 2.45 |
| 4 | 2 | 2.86 | | .48 | 1 | | | | 2 | 2.12 | | .34 | 3 | 3.19 | .10 | .75 |
| 5 | 2 | 1.95 | | | 4 | 3.79 | .47 | .99 | 5 | 4.32 | .26 | .45 | 3 | 2.39 | .37 | 1.46 |
| 6 | 3 | 2.85 | .18 | 2.53 | 3 | 13.13 | .22 | .15 | 6 | 15.46 | .03 | .28 | 2 | 2.08 | .89 | .45 |

Table 24: Diversity measures computed from above ground plant biomass for power transmission lines by year of construction, transect, and study area. R = richness (no. of species); Ec = equibility; V = evenness; DI = diversity index. Values omitted are due to either very low figures for richness or excessive dominance of one species in the transect, making calculations unreliable.

TRANSECTS

| Study Area | Control | | | | Wire | | | | Pylons | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Power Transmission Line - 1924 | | | | | | | | | | | | | | | | |
| 1 | 5 | 4.01 | .72 | 3.76 | 4 | 3.05 | .62 | 2.47 | 7 | 5.58 | .76 | 5.39 | 4 | 2.75 | .82 | 6.41 |
| 2 | 7 | 4.85 | .52 | 7.09 | 12 | 10.98 | .49 | 6.89 | 10 | 6.79 | .69 | 10.79 | 8 | 6.85 | .55 | 8.89 |
| 3 | 13 | 16.09 | .87 | 10.33 | 11 | 12.03 | .7 | 6.34 | 13 | 16.88 | .75 | 5.13 | 10 | 15.41 | .73 | 2.79 |
| 4 | 6 | 7.95 | .54 | 11.33 | 4 | 4.86 | .49 | 2.42 | 7 | 10.62 | .67 | 6.04 | 4 | 5.3 | .79 | 5.79 |
| 5 | 5 | 3.95 | .82 | 7.24 | 9 | 8.3 | .56 | 5.44 | 7 | 6.11 | .69 | 4.10 | 8 | 8.58 | .76 | 12.08 |
| 6 | 4 | 3.52 | .59 | 3.96 | 7 | 7.1 | .58 | 3.69 | 6 | 5.8 | .55 | 1.98 | 5 | 4.39 | .59 | 4.04 |
| 7 | 10 | 17.9 | .63 | 6.66 | 10 | 14.71 | .89 | 4.64 | 6 | 15.18 | .42 | 1.22 | 7 | 9.2 | .18 | 1.25 |
| Power Transmission Line - 1933 | | | | | | | | | | | | | | | | |
| 1 | 4 | 3.59 | .55 | 2.06 | 5 | 4.63 | .43 | 1.5 | 4 | 2.9 | .75 | 3.48 | 5 | 4.14 | .57 | 2.2 |
| 2 | 4 | 3.21 | .83 | 11.99 | 4 | 4.11 | .87 | 3.9 | 5 | 4.68 | .89 | 5.07 | 4 | 3.11 | .96 | 5.57 |
| 3 | 7 | 10.16 | .23 | 1.82 | 7 | 9.78 | .74 | 6.27 | 0 | | | | 5 | 9.26 | .72 | 2.13 |
| 4 | 3 | 2.67 | .67 | 2.03 | 2 | 1.96 | | 1.44 | 2 | 1.65 | | 1.14 | 3 | 2.85 | .66 | 1.4 |
| 5 | 3 | 2.84 | .45 | .8 | 3 | 2.5 | .62 | 1.02 | 3 | 2.18 | .8 | 1.52 | 3 | 2.76 | .2 | .64 |
| 6 | 6 | 7.38 | .58 | 4.58 | 8 | 9.44 | .18 | 3.79 | 7 | 6.72 | .67 | 3.87 | 9 | 13. | .41 | 3.83 |

Table 24 contd

TRANSECTS

| Study Area | Control | | | | Wire | | | | Pylons | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Power Transmission Line - 1933 contd | | | | | | | | | | | | | | | | |
| 7 | 2 | 2.86 | | .48 | 1 | | | | 1 | | | | 1 | | | |
| Power Transmission Line - 1944 | | | | | | | | | | | | | | | | |
| 1 | 8 | 10.88 | .85 | 8.85 | 5 | 4.01 | .47 | 2.56 | 6 | 7.31 | .68 | 3.98 | 5 | 5.17 | .73 | 2.31 |
| 2 | 3 | 4.96 | | .42 | 3 | 4.17 | .29 | .80 | 3 | 3.33 | .17 | .39 | 2 | 3.28 | | .04 |
| 3 | 6 | 6.74 | .5 | 2.96 | 2 | 1.77 | | 1.67 | 2 | 1.53 | | .82 | 4 | 3.45 | .04 | .83 |
| 4 | 4 | 3.21 | .83 | 11.99 | 4 | 4.06 | .93 | 4.8 | 5 | 7.45 | .59 | 3.73 | 4 | 2.61 | .87 | 7.42 |
| 5 | 9 | 7.73 | .79 | 7.48 | 10 | 8.4 | .86 | 10.93 | 5 | 4.05 | .55 | 4.13 | 7 | 6.46 | .19 | 5.12 |
| 6 | 4 | 3.59 | .4 | 5.33 | 4 | 3.23 | .59 | 5.51 | 6 | 4.96 | .7 | 6.31 | 5 | 5.45 | .72 | 6.57 |
| 7 | 4 | 4.82 | .77 | 2.18 | 4 | 3.59 | .89 | 3.53 | 2 | 1.63 | .21 | .53 | 4 | 3.33 | .63 | 3.94 |
| 8 | 2 | 1.74 | .77 | .67 | 3 | 1.81 | .2 | .49 | 2 | 1.27 | .62 | 1.42 | 5 | 3.27 | .07 | .82 |
| 9 | 4 | 4.98 | .84 | 5.27 | 2 | 1.91 | .2 | .33 | 3 | 3. | .33 | .68 | 2 | 2.28 | .01 | .51 |
| 10 | 9 | 8.59 | .82 | 11.02 | 8 | 7.21 | .8 | 7.39 | 9 | 9.27 | .61 | 4.63 | 7 | 8.4 | .81 | 3.94 |

Table 24 contd

TRANSECTS

| Study Area | Control | | | | Wire | | | | Pylons | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Power Transmission Line - 1952 | | | | | | | | | | | | | | | | |
| 1 | 8 | 10.86 | .25 | 5.64 | 7 | 7.01 | .55 | 6.81 | 9 | 12.05 | .72 | 8.36 | 9 | 12.88 | .7 | 4.89 |
| 2 | 9 | 5.62 | .5 | 5.16 | 9 | 6.9 | .62 | 3.5 | 8 | 6.62 | .64 | 2.45 | 8 | 7.35 | .51 | 2.62 |
| 3 | 6 | 5.48 | .53 | 7.75 | 3 | 2.25 | .13 | .54 | 6 | 5.88 | .44 | 2.44 | 5 | 3.73 | .63 | 4.35 |
| 4 | 5 | 4.68 | .2 | 3.19 | 6 | 6.29 | .6 | 10.77 | 6 | 6.89 | .7 | 4.36 | 5 | 6.29 | .3 | 1.98 |
| 5 | 4 | 3.66 | .51 | 3.59 | 6 | 6.4 | .59 | 4.45 | 6 | 7.38 | .31 | 3.03 | 6 | 6.63 | .36 | 1.21 |
| 6 | 6 | 4.79 | .39 | 3.74 | 3 | 1.93 | .64 | 4.4 | 4 | 4.34 | .2 | .59 | 3 | 1.83 | .62 | 2.76 |
| 7 | 6 | 5.02 | .69 | 6.23 | 5 | 4.64 | .83 | 4.74 | 3 | 2.34 | .74 | 2.72 | 3 | 2.03 | .69 | 3.32 |
| 8 | 2 | 1.57 | .16 | 2. | 2 | 1.59 | | .04 | 2 | 1.88 | | .09 | 2 | 1.89 | | .43 |
| Power Transmission Line - 1968 | | | | | | | | | | | | | | | | |
| 1 | 11 | 26.71 | .17 | 5.86 | 11 | 17.7 | .23 | 6.58 | 7 | 7.53 | .82 | 6.22 | 8 | 7.58 | .47 | 8.68 |
| 2 | 8 | 7.81 | .62 | 4.19 | 8 | 8.89 | .55 | 4.49 | 5 | 4.93 | .81 | 1.63 | 9 | 8.18 | .84 | 4.51 |
| 3 | 6 | 6.73 | .56 | 11.32 | 10 | 15.18 | .76 | 11.30 | 6 | 5.9 | .52 | 12.74 | 4 | 5.3 | .79 | 5.76 |
| 4 | 13 | 16.09 | .87 | 10.32 | 9 | 9.08 | .91 | 8.89 | 8 | 8.66 | .79 | 4.85 | 10 | 15.41 | .73 | 2.79 |
| 5 | 10 | 16.56 | .64 | 6.66 | 7 | 8.12 | .44 | 3.68 | 6 | 9.73 | .49 | 3.18 | 7 | 9.8 | .2 | 1.24 |

Table 24 contd

TRANSECTS

| Study Area | Control | | | | Wire | | | | Pylons | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Power Transmission Line - 1969 | | | | | | | | | | | | | | | | |
| 1 | 3 | 3.54 | | .41 | 4 | 5.83 | | .26 | 4 | 3.07 | .89 | 2.34 | 3 | 4.29 | .42 | .43 |
| 2 | 3 | 3.88 | .55 | 3.13 | 3 | 3.63 | .68 | 1.51 | 4 | 2.93 | .56 | 1.20 | 3 | 6.63 | .39 | .31 |
| 3 | 4 | 3.12 | .14 | 2.01 | 3 | 1.94 | .47 | 3.7 | 2 | 1.07 | .71 | 3.12 | 4 | 2.99 | .58 | 4.02 |
| 4 | 3 | 2.27 | .23 | .73 | 3 | 2.01 | .24 | .81 | 3 | 2.11 | .19 | .52 | 3 | 1.8 | .76 | 3.22 |
| 5 | 8 | 7.53 | .72 | 6.15 | 5 | 3.77 | .46 | 7.25 | 4 | 2.87 | .6 | 7.6 | 5 | 3.54 | .7 | 12.72 |
| 6 | 6 | 5.72 | .54 | 4.65 | 4 | 3.76 | .56 | 1.8 | 3 | 2.63 | .75 | 2.24 | 4 | 3.31 | .81 | 3.57 |
| 7 | 14 | 14.34 | .71 | 26.51 | 16 | 16.27 | .51 | 23.27 | 5 | 5.14 | .83 | .8 | 5 | 3.94 | .56 | .76 |
| Power Transmission Line - 1977 | | | | | | | | | | | | | | | | |
| 1 | 3 | 2.28 | .34 | 4.18 | 5 | 3.07 | .23 | 3.34 | 6 | 11.54 | .84 | 2.17 | 6 | 6.73 | .68 | 3.84 |
| 2 | 5 | 4.24 | .21 | 1.22 | 5 | 3.31 | .69 | 4.33 | 5 | 5.13 | .59 | .84 | 6 | 3.96 | .47 | 7.14 |
| 3 | 7 | 6.22 | .49 | 6.80 | 7 | 6.41 | .13 | 1.97 | 4 | 6.3 | | .61 | 6 | 5.86 | .55 | 4.46 |
| 4 | 9 | 14.96 | .55 | 7.39 | 9 | 11.21 | .59 | 6.31 | 6 | 7.57 | .72 | 1.18 | 9 | 13. | .18 | 3.26 |
| 5 | 4 | 3.86 | .38 | 3.29 | 3 | 2.69 | .40 | 1.82 | 9 | 14.95 | .98 | 4.29 | 5 | 4.37 | .31 | 2.29 |
| 6 | 1 | | | | 1 | | | | 1 | | | | 2 | 1.37 | | .4 |

Table 25: Diversity measures computed from above ground plant biomass for the Los Angeles aqueducts by year of construction, transect and study area. R = richness (no. of species); Ec = equibility; V = evenness; DI = diversity index. Values omitted are due to either very low figures for richness or excessive dominance of one species in the transect, making calculations unreliable.

TRANSECTS

| Study Area | Control | | | | Right-of-way | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Los Angeles Aqueduct - 1913 | | | | | | | | | | | | |
| 1 | 6 | 4.66 | .73 | 8.41 | 6 | 4.61 | .78 | 3.48 | 5 | 5.92 | .51 | 2.71 |
| 2 | 7 | 4.98 | .72 | 7.08 | 4 | 2.75 | .08 | .80 | 3 | 1.82 | .61 | 2.76 |
| 3 | 8 | 5.57 | .45 | 5.06 | 7 | 6.4 | .89 | 3.80 | 8 | 5.63 | .45 | 1.48 |
| 4 | 10 | 12.06 | .46 | 7.17 | 4 | 2.76 | .33 | 4.06 | 3 | 2.06 | | .04 |
| 5 | 10 | 6.24 | .82 | 8.24 | 6 | 3.39 | .003 | .23 | 5 | 3.25 | .02 | .96 |
| 6 | 9 | 9.35 | .59 | 12.06 | 8 | 8.02 | .74 | 11.65 | 4 | 3.83 | .47 | 4.10 |
| 7 | 6 | 4.30 | .28 | 1.24 | 7 | 5.82 | .69 | 11.16 | 4 | 2.39 | .28 | 1.22 |
| 8 | 11 | 10.24 | .76 | 7.03 | 9 | 8.42 | .65 | 3.75 | 10 | 9.22 | .82 | 6.57 |
| 9 | 13 | 13.98 | .50 | 4.20 | 5 | 4.21 | .67 | 8.25 | 6 | 4.62 | .74 | 12.03 |
| 10 | 15 | 16.64 | .76 | 9.30 | 10 | 11.29 | .66 | 1.03 | 14 | 21.69 | .78 | 3.41 |
| 11 | 12 | 12.82 | .88 | 3.40 | 11 | 10.08 | .73 | 2.41 | 10 | 11.12 | .74 | 5.81 |
| Los Agneles Aqueduct - 1970 | | | | | | | | | | | | |
| 1 | 5 | 4.47 | .62 | 4.36 | 5 | 4.18 | .56 | 2.13 | 4 | 5.08 | .80 | 1.22 |
| 2 | 6 | 4.8 | .39 | 3.74 | 3 | 2.2 | .01 | .11 | 3 | 1.8 | .61 | 2.76 |

Table 25 contd

TRANSECTS

| Study Area | Control | | | | Right-of-way | | | | Roadedge | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | R | Ec | V | DI | R | Ec | V | DI | R | Ec | V | DI |
| Los Angeles Aqueduct - 1970 contd | | | | | | | | | | | | |
| 3 | 5 | 5.41 | .08 | 1.85 | 8 | 7.95 | .72 | 3.57 | 3 | 1.82 | .61 | 2.76 |
| 4 | 7 | 6.22 | .76 | 5.01 | 9 | 16.78 | .68 | 1.09 | 6 | 8.85 | .67 | .74 |
| 5 | 8 | 5.9 | .94 | 6.41 | 3 | 3.55 | .05 | .13 | 1 | | | |
| 6 | 10 | 12.06 | .46 | 7.17 | 1 | | | | 2 | 1.22 | | .03 |
| 7 | 10 | 6.23 | .82 | 8.23 | 8 | 7.05 | | .60 | 4 | 3.14 | .06 | .27 |
| 8 | 9 | 9.35 | .61 | 12.06 | 6 | 9.02 | .42 | 3.20 | 4 | 3.3 | .48 | 6.11 |
| 9 | 6 | 4.3 | .28 | 1.24 | 3 | 2.63 | .66 | .47 | 2 | | | |
| 10 | 12 | 17.05 | .60 | 6.91 | 4 | 3.43 | | .11 | 4 | 4.56 | | .24 |
| 11 | 11 | 10.33 | .78 | 7.03 | 8 | 7.75 | .53 | 1.54 | 5 | 5.48 | .30 | 2.66 |
| 12 | 9 | 9.85 | .57 | 4.12 | 5 | 4.24 | .03 | .83 | 6 | 4.45 | .15 | .87 |
| 13 | 4 | 3.67 | .51 | 3.58 | 6 | 5.56 | .42 | .67 | 6 | 5.51 | .74 | 1.12 |
| 14 | 5 | 4.35 | .65 | 4.07 | 2 | | | | 2 | | | .03 |
| 15 | 12 | 12.82 | .88 | 3.40 | 6 | 8.97 | .36 | .42 | 7 | 14.24 | .33 | .83 |

Table 26: Analysis of above ground plant biomass by transect in terms of species longevity along a natural gas pipeline constructed in 1956. LL = long lived species; SL = short lived species.

| Study Area | Total biomass $Kg/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect A (Control) | | | | |
| 1 | .0092 | 42.20 | | | 98.11 | | 1.88 |
| 2 | .0855 | 55.28 | 1.26 | | 98.38 | .66 | 1.62 |
| 3 | .0831 | | | | 37.26 | .51 | 62.74 |
| 4 | .0642 | 59.00 | 25.25 | | 92.85 | 5.51 | 7.15 |
| 5 | .0656 | 57.25 | 1.81 | | 95.51 | 1.01 | 4.49 |
| 6 | .0237 | 79.34 | 15.51 | | 99.94 | .06 | .06 |
| 7 | .0470 | 35.12 | 21.98 | | 68.74 | 30.96 | 31.26 |
| 8 | .0428 | 22.76 | 46.51 | | 71.99 | 1.23 | 28.01 |
| | | | Transect B (Berm) | | | | |
| 1 | .0147 | 73.07 | 20.18 | | 100.0 | | |
| 2 | .0513 | 3.55 | 88.27 | | 91.82 | 3.58 | 8.18 |
| 3 | .0185 | 14.23 | .15 | | 33.14 | .15 | 66.86 |
| 4 | .0296 | 40.97 | 9.12 | | 71.81 | 28.19 | 28.19 |
| 5 | .0283 | 4.79 | | | 29.25 | 58.64 | 70.75 |
| 6 | .0110 | 38.01 | 39.91 | | 77.92 | 22.08 | 22.08 |
| 7 | .0243 | | 30.80 | | 31.44 | 44.82 | 68.56 |
| 8 | .0280 | .20 | 84.15 | | 100.00 | | |

Table 26 contd

| Study Area | Total biomass $Kg/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect C (Trench) | | | | |
| 1 | .0070 | 28.16 | 54.29 | | 100.0 | | |
| 2 | .0064 | | 75.51 | | 75.51 | | 24.49 |
| 3 | .0470 | | | 6.22 | 35.10 | 2.83 | 64.88 |
| 4 | .0235 | 23.66 | 4.58 | | 31.08 | 65.44 | 68.91 |
| 5 | .0130 | | | | | 51.49 | 100.00 |
| 6 | .0289 | 39.84 | 22.28 | | 62.12 | 32.38 | 37.88 |
| 7 | .0644 | | 8.55 | | 9.83 | 58.95 | 90.17 |
| 8 | .0280 | .20 | 84.15 | | 84.35 | | 15.65 |
| | | | Transect D (Roadedge) | | | | |
| 1 | .0066 | 90.22 | 9.78 | | 100.00 | | |
| 2 | .0485 | | 83.76 | | 83.76 | | 16.24 |
| 3 | .0655 | 59.59 | | | 76.29 | 8.61 | 23.71 |
| 4 | .0359 | 73.41 | 3.07 | | 82.74 | 9.12 | 17.26 |
| 5 | .0192 | 3.00 | | | 3.00 | 97.00 | 97.00 |
| 6 | .0187 | 32.95 | 17.65 | | 50.60 | 49.40 | 49.40 |
| 7 | .0320 | | 15.31 | | 43.11 | 40.74 | 56.89 |
| 8 | .0543 | | 97.92 | | 97.92 | 1.11 | 2.08 |

Table 27: Analysis of above ground plant biomass by transect in terms of species longevity along a natural gas pipeline constructed in 1960. Headings as in table 26.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect A (Control) | | | | |
| 1 | .0319 | 93.33 | 6.59 | | 99.92 | .08 | .08 |
| 2 | .0818 | 3.80 | 80.34 | | 84.11 | 15.89 | 15.89 |
| 3 | .0631 | | | | 54.78 | .64 | 45.22 |
| 4 | .0668 | 16.43 | 20.53 | | 49.63 | | 50.37 |
| 5 | .2442 | 3.91 | 6.89 | | 86.20 | | 13.80 |
| 6 | .0432 | 72.76 | 18.38 | | 98.19 | 1.81 | 1.81 |
| | | | Transect B (Berm) | | | | |
| 1 | .0024 | | 50.91 | | 50.91 | 49.08 | 49.08 |
| 2 | .0041 | 44.39 | 39.56 | | 83.95 | 16.05 | 16.05 |
| 3 | .0158 | | | | 33.26 | 12.47 | 66.74 |
| 4 | .0201 | 61.03 | 31.18 | | 92.22 | 7.78 | 7.78 |
| 5 | .0342 | .97 | 87.02 | | 88.54 | 4.42 | 11.46 |
| 6 | .0329 | 10.23 | 66.19 | | 76.42 | 23.58 | 23.58 |
| | | | Transect C (Trench) | | | | |
| 1 | .0054 | 27.90 | 20.84 | | 77.07 | 22.93 | 22.93 |
| 2 | .0162 | 13.42 | 39.72 | | 53.14 | 46.86 | 46.86 |
| 3 | .0388 | | | | 65.32 | 1.44 | 34.68 |
| 4 | .0368 | 42.12 | 35.40 | | 77.52 | 10.54 | 10.54 |
| 5 | .0184 | 9.72 | 74.70 | | 84.42 | .78 | 15.58 |
| 6 | .0169 | 28.34 | 62.59 | | 90.94 | 9.06 | 9.06 |

Table 27 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | Transect D (Roadedge) | | | | | |
| 1 | .0096 | .01 | 27.77 | | 27.78 | 72.22 | 72.22 |
| 2 | .0070 | 22.80 | 58.82 | | 81.61 | 18.39 | 18.39 |
| 3 | .0146 | | | | 33.52 | | 66.48 |
| 4 | .0249 | 19.54 | 4.01 | | 23.55 | 76.45 | 76.45 |
| 5 | .0117 | 8.05 | 63.48 | | 71.53 | 21.04 | 28.47 |
| 6 | .0436 | 32.35 | 46.14 | | 95.84 | 4.16 | 4.16 |

Table 28: Analysis of above ground biomass by transect in terms of species longevity along a natural gas pipeline constructed in 1963. Headings as in table 26.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0120 | | | 33.44 | 33.44 | | 66.56 |
| 2 | .0125 | | | 63.29 | 63.29 | | 36.71 |
| 3 | .0516 | | | 88.61 | 88.61 | | 11.39 |
| 4 | .1177 | | | 90.46 | 90.46 | | 9.54 |
| 5 | .0561 | | | | .27 | 60.09 | 99.73 |
| 6 | .0287 | 84.71 | 15.29 | | 100.00 | | |
| 7 | .0202 | 66.60 | 12.05 | | 97.93 | | 2.07 |
| 8 | .0347 | 62.28 | | | 64.25 | 24.71 | 35.75 |
| | | | | Transect B (Berm) | | | |
| 1 | .0004 | | | 14.28 | 14.28 | | 85.72 |
| 2 | .0359 | | | 77.14 | 77.14 | | 22.86 |
| 3 | .0325 | | | 62.09 | 62.09 | | 37.91 |
| 4 | .1585 | | | 93.60 | 93.60 | | 6.40 |
| 5 | .0556 | | | | 14.51 | 41.49 | 98.55 |
| 6 | .0138 | 1.31 | 98.69 | | 100.00 | | |
| 7 | .0081 | 15.13 | 25.40 | | 73.63 | | 26.37 |
| 8 | .0255 | | .53 | | .53 | 61.70 | 99.47 |

Table 28 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Trench) | | | |
| 1 | .0001 | | | 46.15 | 46.15 | | 53.85 |
| 2 | .0320 | | | 76.72 | 76.72 | | 23.28 |
| 3 | .0225 | | | 80.69 | 80.69 | | 19.31 |
| 4 | .0228 | | | 92.13 | 92.13 | | 7.87 |
| 5 | .0271 | | | | 72.49 | | 100.00 |
| 6 | .0125 | 35.15 | 64.64 | | 99.79 | .21 | .21 |
| 7 | .0227 | 95.09 | 1.46 | | 96.55 | | 3.45 |
| 8 | .0257 | | | 8.10 | | 52.35 | 91.90 |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0019 | | | 13.40 | 13.40 | | 86.60 |
| 2 | .0088 | | | 4.01 | 4.01 | | 95.99 |
| 3 | .0829 | | | 88.11 | 88.11 | | 11.89 |
| 4 | .0320 | | | 86.04 | 86.04 | | 13.96 |
| 5 | .0503 | | | | | 57.43 | 100.00 |
| 6 | .0325 | 20.48 | 79.52 | | 100.00 | | |
| 7 | .0209 | 35.66 | 2.89 | | 49.37 | 10.23 | 50.63 |
| 8 | .0104 | 22.03 | 1.47 | | 56.22 | 43.58 | 43.78 |

Table 29: Analysis of above ground biomass by transect in terms of species longevity along a petroleum products pipeline constructed in 1963. Headings as in table 26.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0698 | 50.20 | 18.85 | | 91.04 | | 8.96 |
| 2 | .0601 | 42.21 | 23.30 | | 98.44 | 1.56 | 1.56 |
| | | | | Transect B (Berm) | | | |
| 1 | .0302 | 78.86 | 10.99 | | 100.00 | | |
| 2 | .0183 | 10.82 | 31.67 | | 49.43 | 50.51 | 50.51 |
| | | | | Transect C (Trench) | | | |
| 1 | .0442 | 93.84 | .13 | | 98.16 | 1.84 | 1.84 |
| 2 | .0268 | 51.64 | 14.60 | | 79.88 | 20.12 | 20.12 |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0160 | 93.85 | 5.29 | | 100.00 | | |
| 2 | .0196 | | 35.06 | | 53.87 | 46.13 | 46.13 |

Table 30: Analysis of above ground biomass by transect in terms of species longevity along a petroleum products pipeline constructed in 1970. Headings as in table 26.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect A (Control) | | | | |
| 1 | .0551 | 71.73 | 8.86 | | 97.84 | 2.16 | 2.16 |
| 2 | .0590 | 56.83 | 1.63 | | 100.00 | | |
| 3 | .0396 | 64.35 | | | 88.72 | | 11.28 |
| 4 | .0354 | 69.11 | 22.75 | | 100.00 | | |
| 5 | .0478 | 19.72 | 1.41 | 78.86 | 100.00 | | |
| 6 | .0722 | 47.46 | 16.70 | | 72.50 | | 27.50 |
| 7 | .0318 | 84.56 | | | 100.00 | | |
| | | | Transect B (Berm) | | | | |
| 1 | .0052 | | 43.04 | | 43.04 | 52.92 | 56.96 |
| 2 | .0010 | 51.84 | 48.16 | | 100.00 | | |
| 3 | .0013 | | | | | | 100.00 |
| 4 | .0053 | 66.26 | 19.90 | | 89.58 | 10.04 | 10.42 |
| 5 | .0209 | | 3.54 | 96.46 | 100.00 | | |
| 6 | .0048 | | .93 | | .93 | | 99.07 |
| 7 | .0004 | 100.00 | | | 100.00 | | |

Table 30 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Trench) | | | |
| 1 | .0129 | 9.84 | 10.55 | | 28.16 | 71.04 | 71.04 |
| 2 | .0010 | 92.01 | 7.99 | | 100.00 | | |
| 3 | .0010 | | | | | | 100.00 |
| 4 | .0063 | 15.49 | 48.35 | | 63.85 | 25.67 | 36.15 |
| 5 | .0217 | | 1.72 | 98.28 | 100.00 | | |
| 6 | .0029 | | .33 | | .33 | | 99.67 |
| 7 | .2346 | 38.36 | 6.82 | | 45.18 | | 54.82 |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0031 | | 2.45 | | 2.45 | 97.55 | 97.45 |
| 2 | .001 | 53.07 | 46.93 | | 100.00 | | |
| 3 | .0422 | | | | | | 100.00 |
| 4 | .0095 | 56.46 | 32.69 | | 92.75 | 5.31 | 7.25 |
| 5 | .0621 | 9.62 | | 90.38 | 100.00 | | |
| 6 | .0291 | 50.23 | 10.21 | | 100.00 | | |
| 7 | .0096 | 74.26 | 8.29 | 2.33 | 84.89 | | 15.11 |

Table 31: Analysis of above ground biomass by transect in terms of species longevity along a petroleum products pipeline constructed in 1973. Headings as in table 26.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0232 | 70.92 | 29.08 | | 100.00 | | |
| 2 | .0346 | 43.57 | 55.53 | | 100.00 | | |
| 3 | .0381 | 6.12 | 8.92 | 2.50 | 17.54 | 75.11 | 82.46 |
| 4 | .0023 | | | 96.10 | 96.10 | | 3.90 |
| 5 | .0198 | 58.82 | 41.18 | | 100.00 | | |
| 6 | .3348 | | 3.42 | | 3.42 | | 96.58 |
| | | | | Transect B (Berm) | | | |
| 1 | .0081 | 56.94 | 43.06 | | 100.00 | | |
| 2 | .0082 | 7.27 | 52.03 | | 59.30 | 29.28 | 40.70 |
| 3 | .0156 | 1.06 | 30.30 | | 31.36 | 36.67 | 68.64 |
| 4 | .0143 | | | 100.00 | 100.00 | | |
| 5 | .0193 | .53 | 70.79 | | 71.32 | 20.85 | 28.68 |
| 6 | .0026 | | 64.18 | | 64.18 | | 35.82 |
| | | | | Transect C (Trench) | | | |
| 1 | .0001 | 100.00 | | | 100.00 | | |
| 2 | .0116 | 4.92 | 65.86 | 12.66 | | 10.07 | |
| 3 | .0122 | 1.91 | 40.72 | 16.36 | 58.99 | 20.39 | 41.01 |
| 4 | .0060 | | | 58.19 | 58.19 | | 41.81 |
| 5 | .0131 | 4.48 | 82.23 | | 93.79 | .83 | 6.21 |
| 6 | .0056 | 1.00 | 71.56 | | 73.98 | | 26.02 |

Table 31 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | Transect D (Roadedge) | | | | | |
| 1 | .0113 | 57.36 | 38.07 | 4.57 | 100.00 | | |
| 2 | .0092 | 32.74 | 57.07 | | 91.82 | 7.39 | 8.18 |
| 3 | .0242 | 10.72 | 33.45 | 4.12 | 48.29 | 19.42 | 51.71 |
| 4 | .0432 | | | 91.00 | 91.00 | | 9.00 |
| 5 | .0428 | 17.91 | 80.64 | | 98.55 | | 1.45 |
| 6 | .0083 | 37.42 | | | 37.42 | | 62.58 |

Table 32: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1924. LL = long lived species; SL = short lived species.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0462 | 14.92 | 54.62 | 7.89 | 87.06 | | 12.94 |
| 2 | .1068 | 23.08 | 61.77 | 10.38 | 97.37 | | 2.63 |
| 3 | .0800 | 4.70 | 1.97 | | 27.81 | 7.90 | 72.19 |
| 4 | .1542 | | | 81.72 | 81.72 | .13 | 18.28 |
| 5 | .0785 | | | 87.93 | 92.83 | | 7.17 |
| 6 | .0641 | 59.04 | 35.56 | | 100.00 | | |
| 7 | .0667 | | | 9.58 | 29.54 | 6.12 | 70.46 |
| | | | | Transect B (Wire) | | | |
| 1 | .0389 | 11.59 | 64.50 | | 81.68 | | 18.32 |
| 2 | .0905 | 57.82 | 2.65 | 19.25 | 85.22 | .29 | 14.78 |
| 3 | .0617 | 25.40 | 31.90 | | 61.62 | 5.98 | 38.38 |
| 4 | .0425 | | | 68.01 | 72.93 | 6.55 | 27.07 |
| 5 | .0684 | | .65 | 87.06 | 90.14 | .72 | 9.86 |
| 6 | .0475 | 36.71 | 48.26 | | 89.40 | | 10.60 |
| 7 | .0371 | 17.61 | | | 34.26 | 22.75 | 65.74 |

Table 32 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Pylon) | | | |
| 1 | .0563 | 21.10 | 31.36 | | 58.44 | 2.52 | 41.56 |
| 2 | .1128 | 13.56 | 27.19 | 12.52 | 58.55 | .22 | 41.44 |
| 3 | .0448 | 8.23 | 28.26 | | 36.93 | .72 | 63.07 |
| 4 | .0653 | | | | | 1.14 | 100.00 |
| 5 | .0460 | 3.55 | 1.72 | 49.90 | 56.37 | 8.92 | 43.63 |
| 6 | .0283 | 18.20 | 61.25 | | 83.96 | | 16.04 |
| 7 | .0139 | 42.80 | 6.09 | | 61.03 | 4.59 | 38.97 |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0771 | 28.62 | 48.21 | 13.31 | 90.15 | | 9.85 |
| 2 | .1181 | 55.48 | 27.58 | | 89.25 | 1.80 | 10.75 |
| 3 | .0258 | 8.39 | 33.12 | | 58.14 | | 41.86 |
| 4 | .0699 | | | 65.34 | 65.34 | | 34.66 |
| 5 | .1180 | 9.08 | | 70.62 | 80.00 | 3.75 | 20.00 |
| 6 | .0586 | 54.32 | 36.14 | | 90.46 | | 9.54 |
| 7 | .3150 | | .07 | | 1.04 | 3.15 | 98.96 |

Table 33: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1933. Headings as in table 32.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0352 | 66.09 | 23.10 | | 89.21 | | 10.79 |
| 2 | .1433 | 39.46 | 6.26 | 54.28 | 100.00 | | |
| 3 | .0381 | 6.01 | 8.92 | 2.50 | 17.43 | 75.11 | 82.57 |
| 4 | .0346 | 43.55 | 55.55 | | 100.00 | | |
| 5 | .0190 | 21.61 | 2.48 | 75.91 | 100.00 | | |
| 6 | .0599 | 54.63 | 5.71 | | 98.48 | 1.04 | 1.52 |
| 7 | .0623 | | | | 96.10 | | 3.90 |
| | | | | Transect B (Wire) | | | |
| 1 | .0283 | 28.52 | 67.77 | | 99.45 | | .55 |
| 2 | .0442 | 28.25 | 11.66 | 60.09 | 100.00 | | |
| 3 | .0635 | 2.99 | 40.74 | 19.85 | 63.58 | 17.93 | 36.42 |
| 4 | .0249 | 45.25 | 54.75 | | 100.00 | | |
| 5 | .0187 | 34.27 | 1.47 | 64.26 | 100.00 | | |
| 6 | .0984 | 80.06 | 4.11 | | 98.89 | | 1.11 |
| 7 | .0142 | | | 100.00 | 100.00 | | |

Table 33 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Pylon) | | | |
| 1 | .0457 | 52.13 | 25.23 | | 78.20 | | 21.80 |
| 2 | .0507 | 32.41 | 16.46 | 48.13 | 93.00 | | 3.00 |
| 3 | | | | | | | |
| 4 | .0245 | 70.97 | 29.03 | | 100.00 | | |
| 5 | .0223 | 30.91 | 12.03 | 57.06 | 100.00 | | |
| 6 | .0443 | 33.87 | 39.25 | | 99.72 | .28 | .28 |
| 7 | .0093 | | | 100.00 | 100.00 | | |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0335 | 48.55 | 46.12 | .27 | 99.34 | | .66 |
| 2 | .0579 | 17.36 | 20.06 | 62.58 | 100.00 | | |
| 3 | .0241 | 5.32 | 49.15 | 16.29 | 71.22 | 15.32 | 28.78 |
| 4 | .0240 | 48.03 | 51.88 | | 99.90 | | .10 |
| 5 | .0289 | 8.66 | 2.85 | 88.49 | 100.00 | | |
| 6 | .0528 | 61.11 | 1.67 | | 96.64 | 1.49 | 3.63 |
| 7 | .0175 | | | 100.00 | 100.00 | | |

Table 34: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1944. Headings as in table 32.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0778 | 24.59 | 13.95 | | 75.93 | | 24.07 |
| 2 | .0200 | 3.92 | 7.03 | 89.05 | 100.00 | | |
| 3 | .0446 | .78 | .57 | 39.00 | 95.40 | | 4.60 |
| 4 | .1433 | 39.46 | 6.26 | 54.20 | 100.00 | | |
| 5 | .0700 | | | | 73.84 | | 26.16 |
| 6 | .1199 | 10.80 | 12.40 | | 23.21 | | 76.79 |
| 7 | .0270 | 43.35 | 37.38 | 16.60 | 100.00 | | |
| 8 | .0145 | 71.39 | 28.61 | | 100.00 | | |
| 9 | .0610 | 29.19 | 24.35 | | 100.00 | | |
| 10 | .1034 | 32.95 | 12.54 | | 90.11 | 7.92 | 9.89 |
| | | | | Transect B (Wire) | | | |
| 1 | .0463 | 16.53 | 69.59 | | 96.91 | | 3.09 |
| 2 | .0223 | 1.92 | 17.92 | 80.15 | 100.00 | | |
| 3 | .0832 | | | 89.30 | 89.30 | | 10.70 |
| 4 | .0513 | 40.42 | 20.63 | 38.95 | 100.00 | | |
| 5 | .0917 | | | | 67.40 | | 32.60 |
| 6 | .0903 | 24.25 | 10.10 | | 34.35 | | 65.65 |
| 7 | .0391 | 31.19 | 38.03 | 23.15 | 100.00 | | |
| 8 | .0271 | 9.21 | 90.49 | | 99.70 | .30 | .30 |
| 9 | .0208 | 91.79 | 8.21 | | 100.00 | | |
| 10 | .0698 | 32.97 | 25.15 | | 91.30 | 8.08 | 8.70 |

Table 34 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Pylon) | | | |
| 1 | .0463 | 33.47 | 42.74 | 6.53 | 99.13 | | .87 |
| 2 | .0170 | 3.06 | 9.02 | 87.92 | 100.00 | | |
| 3 | .1914 | | | 97.84 | 97.84 | | 2.16 |
| 4 | .0497 | 46.47 | 5.15 | 47.73 | 99.35 | .65 | .65 |
| 5 | .0653 | | | | 82.31 | | 17.69 |
| 6 | .0738 | 3.18 | 36.44 | 12.86 | 52.48 | 3.94 | 47.52 |
| 7 | .0346 | 8.02 | | 91.98 | 100.00 | | |
| 8 | .0387 | 21.13 | 78.87 | | 100.00 | | |
| 9 | .0201 | 81.55 | 15.86 | | 97.41 | 2.59 | 2.59 |
| 10 | .0532 | 9.97 | 23.93 | | 88.08 | 5.66 | 11.92 |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0276 | 24.66 | 23.88 | | 53.02 | | 46.98 |
| 2 | .0286 | | .76 | 99.24 | 100.00 | | |
| 3 | .0753 | .02 | | 94.33 | 94.35 | .14 | 5.65 |
| 4 | .0450 | 10.40 | 15.38 | 74.22 | 100.00 | | |
| 5 | .1611 | | | | 95.29 | | 4.71 |
| 6 | .0786 | 23.38 | 1.71 | 30.97 | 56.06 | | 43.94 |
| 7 | .0604 | 13.70 | 61.63 | 23.62 | 100.00 | | |
| 8 | .0733 | .10 | 94.32 | | 94.42 | 1.23 | 5.59 |
| 9 | .0606 | 95.65 | 4.35 | | 100.00 | | |
| 10 | .0377 | 33.44 | 16.75 | | 81.65 | 18.10 | 18.35 |

Table 35: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1952. Headings as in table 32.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .1127 | 73.79 | 6.87 | | 93.61 | | 6.39 |
| 2 | .0474 | 13.04 | 31.64 | | 66.96 | 4.51 | 33.04 |
| 3 | .1154 | 49.99 | 6.45 | | 99.73 | | .27 |
| 4 | .1080 | .06 | .87 | 84.50 | 89.73 | 10.27 | 10.27 |
| 5 | .0457 | 67.47 | .82 | | 94.68 | | 5.32 |
| 6 | .0741 | 4.41 | 19.10 | 75.73 | 99.90 | | .10 |
| 7 | .0743 | 58.01 | 33.39 | | 93.87 | | 6.13 |
| 8 | .1685 | 6.15 | | 93.85 | 100.00 | | |
| | | | | Transect B (Wire) | | | |
| 1 | .0914 | 58.37 | 20.25 | | 84.55 | | 15.44 |
| 2 | .0408 | 2.78 | 52.92 | | 63.62 | 6.15 | 36.38 |
| 3 | .0487 | 70.76 | 17.67 | | 100.00 | | |
| 4 | .1415 | 23.31 | 7.21 | 56.46 | 96.49 | 3.51 | 3.51 |
| 5 | .0593 | 44.66 | 5.17 | | 92.74 | .90 | 7.26 |
| 6 | .0799 | 9.27 | 22.47 | 68.26 | 100.00 | | |
| 7 | .0510 | 37.88 | 25.71 | | 89.71 | 1.39 | 10.29 |
| 8 | .1476 | .13 | | 99.87 | 100.00 | | |

Table 35 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect C (Pylon) | | | | |
| 1 | .0816 | 35.09 | 2.45 | | 40.46 | | 59.54 |
| 2 | .0287 | 5.36 | 52.15 | | 58.22 | 10.22 | 41.78 |
| 3 | .0416 | 67.01 | 20.61 | | 96.67 | | 3.33 |
| 4 | .0496 | 3.70 | 17.99 | 44.46 | 71.27 | 28.73 | 8.73 |
| 5 | .0620 | 73.58 | .70 | | 90.21 | 2.21 | 9.79 |
| 6 | .0200 | | 11.18 | 84.50 | 100.00 | | |
| 7 | .0430 | 45.52 | 48.12 | | 96.64 | | 3.36 |
| 8 | .0850 | .54 | | 99.46 | 100.00 | | |
| | | | Transect D (Roadedge) | | | | |
| 1 | .0484 | 25.48 | 8.43 | | 49.09 | | 50.91 |
| 2 | .0370 | | 59.40 | | 64.06 | 24.40 | 35.94 |
| 3 | .0612 | 56.62 | 16.60 | | 99.67 | .33 | .33 |
| 4 | .0434 | 9.81 | 4.50 | 75.88 | 90.23 | 9.77 | 9.77 |
| 5 | .0230 | 71.42 | 6.39 | | 95.20 | | 4.80 |
| 6 | .0516 | 4.45 | 27.90 | 67.65 | 100.00 | | |
| 7 | .0743 | 58.01 | 33.39 | | 93.87 | | 6.13 |
| 8 | .0961 | 2.28 | | 97.72 | 100.00 | | |

Table 36: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1968. Headings as in table 32.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | |
| 1 | .0852 | 55.50 | 1.26 | 1.02 | 95.63 | .66 | 4.37 |
| 2 | .0491 | | | | 66.72 | | 33.28 |
| 3 | .1542 | | | 81.72 | 81.72 | 1.30 | 18.29 |
| 4 | .0800 | 4.70 | 1.97 | | 42.12 | 7.90 | 57.88 |
| 5 | .0667 | | | 9.58 | 29.54 | 16.12 | 70.45 |
| | | | | Transect B (Wire) | | | |
| 1 | .1139 | 6.92 | 13.63 | 1.94 | 96.85 | .02 | 3.15 |
| 2 | .0540 | | | | 69.11 | | 30.89 |
| 3 | .1016 | | | 34.17 | 76.94 | 1.11 | 23.06 |
| 4 | .0727 | 11.37 | 13.32 | | 41.07 | 17.34 | 58.93 |
| 5 | .0573 | .03 | | | 25.26 | 5.09 | 74.74 |
| | | | | Transect C (Pylon) | | | |
| 1 | .0594 | 29.39 | | 11.57 | 69.13 | 20.63 | 30.87 |
| 2 | .0178 | | | | 18.74 | | 81.26 |
| 3 | .1888 | | | 70.26 | 94.29 | .45 | 5.71 |
| 4 | .0460 | 10.95 | 26.10 | | 40.07 | 1.10 | 59.93 |
| 5 | .0437 | | | | 36.51 | .43 | 63.49 |

Table 36 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect D (Roadedge) | | | |
| 1 | .1292 | 12.49 | 2.60 | 11.27 | 96.23 | 2.12 | 3.77 |
| 2 | .0397 | | | | 56.15 | | 43.85 |
| 3 | .0699 | | | 65.34 | 99.59 | | .41 |
| 4 | .0258 | .0839 | 33.12 | | 83.32 | | 16.68 |
| 5 | .0315 | | .07 | | 1.04 | 3.15 | 98.96 |

Table 37: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1969. Headings as in table 32.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect A (Control) | | | | |
| 1 | .0582 | 96.34 | 3.62 | | 99.96 | .04 | .04 |
| 2 | .0590 | 69.60 | 8.40 | | 78.02 | 21.98 | 21.98 |
| 3 | .0829 | 90.28 | 7.93 | | 98.22 | | 1.78 |
| 4 | .0325 | 88.47 | 7.26 | | 100.00 | | |
| 5 | .0642 | 31.80 | 25.23 | | 67.50 | | 32.50 |
| 6 | .0681 | 46.25 | 46.73 | | 98.85 | 1.15 | 1.15 |
| 7 | .2442 | 3.91 | 6.89 | | 86.20 | | 13.80 |
| | | | Transect B (Wire) | | | | |
| 1 | .0228 | 94.05 | 5.50 | | 99.56 | .29 | .44 |
| 2 | .0246 | 64.22 | 22.21 | | 86.43 | 13.57 | 13.57 |
| 3 | .0909 | 77.08 | 19.84 | | 100.00 | | |
| 4 | .0368 | 88.46 | 10.26 | | 100.00 | | |
| 5 | .1363 | 6.67 | 22.22 | | 30.16 | | 69.84 |
| 6 | .0301 | 56.90 | 40.92 | | 98.86 | 1.14 | 1.14 |
| 7 | .2812 | .57 | 2.35 | | 85.33 | | 14.67 |

Table 37 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect C (Pylon) | | | | |
| 1 | .0262 | 34.77 | 31.63 | | 66.40 | 28.75 | 33.60 |
| 2 | .0209 | 26.58 | 68.59 | | 95.17 | 4.83 | 4.83 |
| 3 | .0752 | 24.68 | 75.32 | | 100.00 | | |
| 4 | .0281 | 90.41 | 2.90 | | 100.00 | | |
| 5 | .1233 | 13.04 | 15.48 | | 28.53 | 5.57 | 71.47 |
| 6 | .0344 | 56.52 | 36.17 | | 92.70 | 1.48 | 7.30 |
| 7 | .0085 | | 33.89 | | 45.07 | 31.88 | 54.93 |
| | | | Transect D (Roadedge) | | | | |
| 1 | .0095 | .01 | 27.77 | | 27.78 | 72.22 | 72.22 |
| 2 | .0060 | 40.72 | 58.41 | | 99.13 | .53 | .87 |
| 3 | .0674 | 38.82 | 58.39 | | 98.08 | | 1.92 |
| 4 | .0499 | 46.11 | 49.39 | | 100.00 | | |
| 5 | .1617 | 26.05 | 22.16 | | 49.43 | .45 | 50.57 |
| 6 | .0436 | 32.35 | 46.14 | | 95.84 | 4.16 | 4.16 |
| 7 | .0117 | 8.05 | 63.48 | | 71.53 | 21.04 | 28.47 |

Table 38: Analysis of above ground biomass by transect in terms of species longevity along a power transmission line constructed in 1977. Headings as in table 32.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | Transect A (Control) | | | | |
| 1 | .0578 | 53.73 | 15.70 | | 100.00 | | |
| 2 | .0423 | 85.05 | 7.10 | | 100.00 | | |
| 3 | .1041 | 40.27 | 1.91 | | 42.18 | | 57.82 |
| 4 | .0839 | 44.37 | 3.24 | 32.52 | 91.96 | 4.77 | 8.04 |
| 5 | .0759 | 25.84 | .18 | 73.95 | 99.72 | | .28 |
| 6 | .0274 | 100.00 | | | 100.00 | | |
| | | | Transect B (Wire) | | | | |
| 1 | .0414 | 23.66 | 14.86 | 9.34 | 100.00 | | |
| 2 | .0558 | 50.86 | 32.09 | | 98.93 | 1.07 | 1.07 |
| 3 | .0796 | 8.77 | .11 | | 8.88 | | 91.12 |
| 4 | .0720 | 10.20 | 3.82 | 51.35 | 90.40 | 4.64 | 9.60 |
| 5 | .0480 | 8.53 | 11.71 | 79.76 | 100.00 | | |
| 6 | .0131 | 100.00 | | | 100.00 | | |
| | | | Transect C (Pylon) | | | | |
| 1 | .0207 | 22.24 | 32.25 | 20.52 | 98.79 | | 1.21 |
| 2 | .0119 | 58.35 | 25.45 | | 89.18 | 10.82 | 10.82 |
| 3 | .0315 | 8.78 | .25 | | 9.03 | | 90.97 |
| 4 | .0131 | 14.68 | 45.51 | | 86.32 | | 13.68 |
| 5 | .0327 | .58 | 29.89 | 41.89 | 96.29 | 20.72 | 3.71 |
| 6 | .0065 | 100.00 | | | 100.00 | | |

Table 38 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | |
|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Total LL | Hymen-oclea | Total SL |
| | | | | Transect D (Roadedge) | | | |
| 1 | .0447 | 28.75 | 14.27 | 7.22 | 98.82 | 1.18 | 1.18 |
| 2 | .1251 | 63.81 | 31.91 | | 99.35 | .01 | .65 |
| 3 | .0634 | 44.27 | 4.01 | | 48.28 | | 51.72 |
| 4 | .0692 | | 50.01 | 76.00 | 92.88 | 4.94 | 7.12 |
| 5 | .0578 | | 13.05 | 78.87 | 91.92 | .14 | 8.08 |
| 6 | .0195 | 89.19 | 10.81 | | 100.00 | | |

Table 39: Analysis of above ground biomass by transect in terms of species longevity along the Los Angeles aqueduct constructed in 1913. LL = long lived species; SL = short lived species.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Chryso-thamnus | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control | | | | |
| 1 | .0950 | 34.89 | .08 | 39.39 | | 74.59 | 10.23 | 25.41 |
| 2 | .0776 | 47.54 | 12.02 | | | 69.77 | 10.99 | 30.23 |
| 3 | .0825 | 67.26 | 6.55 | | | 79.72 | 5.29 | 20.28 |
| 4 | .0973 | 59.48 | 13.07 | | | 81.03 | | 18.97 |
| 5 | .0735 | | | | | 17.21 | 9.83 | 82.99 |
| 6 | .1423 | | 10.36 | | | 90.15 | 3.96 | 9.85 |
| 7 | .0338 | | | | | 4.13 | 81.11 | 95.87 |
| 8 | .0645 | .09 | 12.58 | | | 77.49 | 11.96 | 22.51 |
| 9 | .0524 | 2.10 | .22 | 51.91 | 3.88 | 65.75 | 28.94 | 34.25 |
| 10 | .0789 | | 4.44 | | | 69.29 | 15.81 | 30.71 |
| 11 | .0267 | 3.19 | 9.77 | | 13.22 | 63.20 | 5.69 | 36.80 |

Table 39 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Chryso-thamnus | Total LL | Hymen-oclea | Total SL |
| | | | | Transect B (Right of Way) | | | | |
| 1 | .0372 | | 2.42 | 28.31 | | 37.68 | 26.74 | 62.32 |
| 2 | .0795 | | .09 | | 94.84 | 94.93 | .73 | 5.07 |
| 3 | .0339 | 12.17 | 29.37 | | | 64.67 | | 35.33 |
| 4 | .0116 | 17.19 | | | 81.82 | 99.01 | | .99 |
| 5 | .1000 | | | | 98.83 | 98.83 | .38 | 1.17 |
| 6 | .0117 | 29.77 | 7.16 | | 4.52 | 53.78 | 37.52 | 46.22 |
| 7 | .1270 | | | | 76.97 | 76.97 | 8.47 | 23.03 |
| 8 | .0421 | 7.75 | 14.50 | | | 24.44 | 47.47 | 75.56 |
| 9 | .1085 | | | 50.65 | 34.58 | 92.23 | 4.61 | 7.77 |
| 10 | .0106 | | 5.59 | | 11.60 | 29.21 | 3.81 | 70.79 |
| 11 | .0230 | .28 | 19.36 | | 23.87 | 81.42 | 13.42 | 18.58 |

Table 39 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Chryso-thamnus | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Roadedge) | | | | |
| 1 | .0425 | .07 | .06 | 41.51 | | 41.64 | 4.57 | 58.36 |
| 2 | .0527 | 4.35 | 27.21 | 68.43 | | 100.00 | | |
| 3 | .0246 | 5.90 | 1.88 | | | 92.47 | | 7.53 |
| 4 | .1632 | .11 | | | 99.89 | 100.00 | | |
| 5 | .1905 | | | | 97.48 | 97.48 | .21 | 2.52 |
| 6 | .0795 | 8.19 | | | 72.47 | 8.19 | 9.61 | 91.81 |
| 7 | .0378 | | | | | 4.29 | 83.30 | 95.71 |
| 8 | .0578 | 3.99 | 13.71 | | 16.35 | 40.09 | 20.65 | 59.91 |
| 9 | .1348 | | | 32.71 | 40.45 | 91.39 | 2.77 | 8.61 |
| 10 | .0280 | | 2.16 | | 13.38 | 62.48 | .37 | 37.52 |
| 11 | .0550 | 21.19 | 2.82 | | 36.98 | 86.83 | .81 | 13.17 |

Table 40: Analysis of above ground biomass by transect in terms of species longevity along the Los Angeles aqueduct constructed in 1970. Headings as in table 39.

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Chryso-thamnus | Total LL | Hymen-oclea | Total SL |
| | | | | Transect A (Control) | | | | |
| 1 | .0607 | 56.74 | 22.82 | | | 98.77 | 1.23 | 1.23 |
| 2 | .0741 | 4.41 | 19.10 | 72.73 | | 99.91 | | .09 |
| 3 | .0896 | 89.34 | 6.86 | | | 99.75 | .25 | .25 |
| 4 | .0515 | 15.95 | 34.22 | | | 83.43 | | 16.57 |
| 5 | .0525 | 8.90 | 9.65 | | | 40.12 | 12.62 | 59.88 |
| 6 | .0973 | 59.48 | 13.07 | | | 81.03 | .98 | 18.93 |
| 7 | .0735 | | | | | 17.21 | 9.83 | 82.79 |
| 8 | .1423 | 48.28 | 10.36 | | | 90.14 | 3.96 | 9.86 |
| 9 | .0338 | | | | | 4.13 | 81.11 | 95.87 |
| 10 | .0714 | 1.44 | 3.01 | 42.70 | | 75.30 | 11.59 | 24.70 |
| 11 | .0645 | .09 | 12.58 | | | 77.49 | 11.96 | 22.51 |
| 12 | .0498 | | 1.02 | | | 63.10 | 34.32 | 36.90 |
| 13 | .0653 | 67.25 | .82 | | | 94.64 | | 5.36 |
| 14 | .0549 | 16.86 | 57.90 | | | 75.87 | 16.20 | 24.13 |
| 15 | .0267 | 3.19 | 9.77 | | 13.22 | 63.10 | 5.69 | 36.90 |

Table 40 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Chryso-thamnus | Total LL | Hymen-oclea | Total SL |
| | | | | Transect B (Right of Way) | | | | |
| 1 | .0326 | 2.14 | 3.61 | 54.30 | | 60.05 | 39.51 | 39.95 |
| 2 | .0273 | .37 | 1.67 | 97.96 | | 100.00 | | |
| 3 | .0369 | 7.72 | 20.16 | 43.98 | | 71.86 | 24.32 | 28.14 |
| 4 | .0106 | | 33.50 | | 25.68 | 62.79 | 12.18 | 37.21 |
| 5 | .0083 | | | | | | 91.55 | 100.00 |
| 6 | .0383 | | | | 100.00 | 100.00 | | |
| 7 | .0845 | | | | | | .22 | 100.00 |
| 8 | .0496 | 49.81 | | | 45.76 | 95.74 | 3.94 | 4.26 |
| 9 | .0082 | | | | 39.74 | 39.74 | 59.35 | 60.26 |
| 10 | .0453 | | | | | | .10 | 100.00 |
| 11 | .0208 | | 1.46 | | 7.71 | 11.46 | 39.31 | 88.54 |
| 12 | .0556 | | .37 | | | 5.67 | 1.77 | 94.33 |
| 13 | .0121 | .52 | 16.45 | | | 28.51 | 69.49 | 71.49 |
| 14 | .0103 | | .16 | | | .16 | 99.84 | 99.84 |
| 15 | .0071 | | | | 74.37 | 74.37 | 17.22 | 25.63 |

Table 40 contd

| Study Area | Total biomass $K_g/m^2$ | % of biomass provided by | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Larrea | Ambrosia | Atriplex | Chryso-thamnus | Total LL | Hymen-oclea | Total SL |
| | | | | Transect C (Roadedge) | | | | |
| 1 | .0147 | | 1.53 | 29.59 | | 31.12 | 24.93 | 68.88 |
| 2 | .0527 | 4.35 | 27.21 | 68.43 | | 100.00 | | |
| 3 | .0527 | 4.35 | 27.21 | 68.43 | | 100.00 | | |
| 4 | .0084 | | 9.29 | | 43.05 | 56.11 | 6.47 | 43.89 |
| 5 | .0011 | | | | | | 100.00 | 100.00 |
| 6 | .0374 | .40 | | | 96.60 | 100.00 | | |
| 7 | .0244 | | | | 94.33 | 94.33 | 2.58 | 5.67 |
| 8 | .1185 | 7.14 | | | 70.99 | 78.13 | 1.40 | 21.87 |
| 9 | .0039 | | | | | | 63.89 | 100.00 |
| 10 | .0181 | | | | 1.94 | 1.94 | 4.60 | 98.06 |
| 11 | .0629 | | .59 | | 17.89 | 18.48 | 4.69 | 81.52 |
| 12 | .0295 | | 1.04 | | .32 | 2.84 | 12.95 | 97.16 |
| 13 | .0124 | 8.99 | 17.10 | | | 49.88 | 46.56 | 50.12 |
| 14 | .0034 | | 3.61 | | | 3.61 | 96.39 | 96.39 |
| 15 | .0122 | | 2.04 | | | 84.20 | 11.90 | 15.80 |

Table 41: Jaccard's Coefficient of Similarity for Pairs of transects (CCj) along pipelines constructed in 1956 and 1973. A = control; B = berm; C = trench; D = roadedge.

PIPELINES

| Area | 1956 Transects compared | | | Area | 1973 Transects compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| 1 | .324 | .248 | .492 | 1 | .520 | .002 | .623 |
| 2 | .075 | .028 | .016 | 2 | .228 | .366 | .376 |
| 3 | .195 | .308 | .122 | 3 | .414 | .341 | .351 |
| 4 | .441 | .247 | .659 | 4 | .373 | .103 | .791 |
| 5 | .084 | .025 | .030 | 5 | .422 | .532 | .505 |
| 6 | .454 | .578 | .447 | 6 | .015 | .032 | .048 |
| 7 | .520 | .365 | .458 | | | | |
| 8 | .432 | .688 | .756 | | | | |
| Mean | .316 | .311 | .372 | | .329 | .229 | .449 |
| Standard deviation | .176 | .235 | .284 | | .181 | .214 | .255 |

Table 42: Jaccards Coefficient of Similarity for Paris of transects along pipelines constructed in 1960 and 1963. A = control; B = berm; C = trench; D = roadedge.

PIPELINES

| Area | 1960 Transects compared | | | Area | 1963 Transects compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| 1 | .073 | .143 | .103 | 1 | .549 | .629 | .373 |
| 2 | .096 | .331 | .158 | 2 | .254 | .515 | .238 |
| 3 | .082 | .195 | .253 | | | | |
| 4 | .397 | .463 | .128 | | | | |
| 5 | .138 | .139 | .066 | | | | |
| 6 | .318 | .450 | .526 | | | | |
| Mean | .184 | .287 | .206 | | .401 | .572 | .306 |
| Standard deviation | .138 | .149 | .169 | | .209 | .081 | .095 |

Table 43: Jaccard's Coefficient of similarity for Pairs of transects along pipelines constructed in 1963 and 1970. A = control; B = berm; C = trench; D = roadedge.

PIPELINES

| Area | 1963 Transects compared | | | Area | 1970 Transects compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| 1 | .0535 | .078 | .617 | 1 | .114 | .145 | .043 |
| 2 | .502 | .562 | .464 | 2 | .035 | .034 | .036 |
| 3 | .0538 | .608 | .631 | 3 | .052 | .066 | .109 |
| 4 | .826 | .241 | .461 | 4 | .224 | .194 | .392 |
| 5 | .559 | .044 | .527 | 5 | .607 | .624 | .794 |
| 6 | .215 | .426 | .361 | 6 | .126 | .077 | .400 |
| 7 | .530 | .658 | .522 | 7 | .003 | .027 | .346 |
| 8 | .412 | .421 | .411 | | | | |
| Mean | .394 | .379 | .499 | | .166 | .167 | .303 |
| Standard deviation | .269 | .236 | .094 | | .208 | .210 | .270 |

Table 44: Jaccard's Coefficient of Similarity for Pairs of transects along power transmission lines constructed in 1924 and 1977. A = control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1924 Transects compared | | | Area | 1977 Transects compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| 1 | .781 | .671 | .677 | 1 | .678 | .326 | .720 |
| 2 | .425 | .541 | .538 | 2 | .708 | .370 | .476 |
| 3 | .282 | .292 | .261 | 3 | .720 | .464 | .750 |
| 4 | .357 | .101 | .443 | 4 | .678 | .108 | .547 |
| 5 | .670 | .378 | .491 | 5 | .691 | .259 | .684 |
| 6 | .753 | .487 | .864 | 6 | .647 | .386 | .742 |
| 7 | .473 | .176 | .576 | | | | |
| Mean | .534 | .378 | .550 | | .687 | .319 | .653 |
| Standard deviation | .199 | .204 | .189 | | .026 | .123 | .114 |

Table 45: Jaccard's Coefficient of Similarity for Pairs of transects along power transmission lines constructed in 1924 and 1968. Areas 3, 4 and 7 of the 1924 line are side by side areas 3, 4 and 5 respectively of the 1968 line. A = control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1924 Transects compared | | | Area | 1968 Transects compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| | | | | 1 | .421 | .672 | .458 |
| | | | | 2 | .715 | .459 | .646 |
| 4 | .357 | .101 | .443 | 3 | .519 | .389 | .445 |
| 3 | .282 | .292 | .261 | 4 | .509 | .505 | .288 |
| 7 | .473 | .176 | .576 | 5 | .603 | .459 | .576 |
| Mean | .371 | .180 | .427 | | .553 | .497 | .482 |
| Standard deviation | .096 | .096 | .158 | | .111 | .106 | .137 |

Table 46: Jaccard's Coefficient of Similarity for Pairs of transects along power transmission lines constructed in 1933 and 1969. A = control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1933 Transect compared | | | Area | 1969 Transect compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| 1 | .515 | .777 | .710 | 1 | .561 | .266 | .063 |
| 2 | .471 | .507 | .549 | 2 | .576 | .340 | .185 |
| 3 | .403 | | .320 | 3 | .812 | .297 | .404 |
| 4 | .836 | .751 | .817 | 4 | .911 | .912 | .649 |
| 5 | .870 | .838 | .793 | 5 | .471 | .565 | .517 |
| 6 | .626 | .544 | .785 | 6 | .613 | .638 | .627 |
| 7 | .370 | .259 | .438 | 7 | .693 | .023 | .066 |
| Mean | .584 | .613 | .630 | | .662 | .434 | .359 |
| Standard deviation | .201 | .218 | .196 | | .154 | .292 | .254 |

Table 47: Jaccard's Coefficient of Similarity for Pairs of transects along power transmission lines constructed in 1944 and 1952. A = control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1944 Transects compared | | | Area | 1952 Transects compared | | |
|---|---|---|---|---|---|---|---|
| | A/B | A/C | A/D | | A/B | A/C | A/D |
| 1 | .309 | .551 | .524 | 1 | .629 | .345 | .244 |
| 2 | .929 | .910 | .743 | 2 | .677 | .679 | .539 |
| 3 | .294 | .159 | .314 | 3 | .578 | .500 | .658 |
| 4 | .511 | .511 | .571 | 4 | .726 | .433 | .504 |
| 5 | .597 | .481 | .263 | 5 | .766 | .868 | .480 |
| 6 | .771 | .507 | .492 | 6 | .919 | .407 | .817 |
| 7 | .817 | .236 | .537 | 7 | .577 | .733 | .856 |
| 8 | .319 | .463 | .096 | 8 | .934 | .674 | .727 |
| 9 | .477 | .484 | .336 | | | | |
| 10 | .657 | .319 | .507 | | | | |
| Mean | .568 | .462 | .438 | | .726 | .580 | .603 |
| Standard deviation | .226 | .205 | .185 | | .140 | .184 | .202 |

Table 48: Jaccard's Coefficient of Similarity for Pairs of transects along the Los Angeles aqueducts constructed in 1913 and 1970. A = control; B = right-of-way; C = roadedge.

AQUEDUCTS

| Area | 1913 Transects compared A/B | 1913 Transects compared A/C | Area | 1970 Transects compared A/B | 1970 Transects compared A/C |
|---|---|---|---|---|---|
| 1 | .511 | .495 | 1 | .056 | .026 |
| 2 | .052 | .178 | 2 | .538 | .828 |
| 3 | .247 | .130 | 3 | .146 | .119 |
| 4 | .187 | .001 | 4 | .152 | .070 |
| 5 | .012 | .020 | 5 | .241 | .042 |
| 6 | .389 | .109 | 6 | .000 | .002 |
| 7 | .178 | .895 | 7 | .030 | .027 |
| 8 | .275 | .295 | 8 | .279 | |
| 9 | .456 | .399 | 9 | .164 | .207 |
| 10 | .075 | .059 | 10 | .147 | .206 |
| 11 | .404 | .286 | 11 | .200 | .052 |
| | | | 12 | .024 | .107 |
| | | | 13 | .050 | .114 |
| | | | 14 | .273 | .116 |
| | | | 15 | .107 | .232 |
| Mean | .253 | .261 | | .160 | .148 |
| Standard deviation | .170 | .263 | | .138 | .201 |

Table 49: Community Quality Indices for perennial vegetation along two pipelines constructed in 1956 and 1973. A = control; B = berm; C = trench; D = roadedge.

POWERLINES

| Area | 1956 Transect A | B | C | D | Area | 1973 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .94 | 1.60 | .88 | .59 | 1 | 1.54 | .42 | .002 | .87 |
| 2 | 7.09 | 1.98 | .87 | 1.48 | 2 | 2.97 | .58 | 1.13 | 1.11 |
| 3 | 3.35 | .88 | 1.84 | 2.76 | 3 | 1.52 | .68 | .94 | 1.63 |
| 4 | 4.29 | 1.78 | 2.00 | 1.99 | 4 | 2.21 | .74 | .60 | 3.36 |
| 5 | 3.28 | 1.03 | 1.77 | .81 | 5 | 2.95 | 1.09 | 2.03 | 3.80 |
| 6 | 2.15 | 1.24 | 2.61 | 1.61 | 6 | 3.20 | .18 | .56 | .44 |
| 7 | 2.78 | 1.35 | 2.03 | 1.42 | | | | | |
| 8 | 2.92 | 2.57 | 1.08 | 2.01 | | | | | |
| Mean | 3.50 | 1.55 | 1.63 | 1.58 | | 2.40 | .61 | .88 | 1.87 |
| Standard deviation | 1.80 | .55 | .63 | .69 | | .75 | .31 | .68 | 1.39 |

Table 50: Community Quality Indices for perennial vegetation along two pipelines constructed in 1960 and 1963. A = control; B = berm; C = trench; D = roadedge.

POWERLINES

| Area | 1960 Transect A | B | C | D | Area | 1963 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .24 | .30 | .09 | .06 | 1 | 4.63 | 3.10 | 4.08 | 1.12 |
| 2 | .36 | .05 | .13 | .50 | 2 | 4.85 | 1.54 | 2.49 | 1.52 |
| 3 | 2.87 | 1.05 | 2.51 | .75 | | | | | |
| 4 | 2.79 | 1.92 | 2.94 | 1.16 | | | | | |
| 5 | 4.24 | 2.21 | 1.91 | .89 | | | | | |
| 6 | 4.36 | 3.82 | 1.59 | 4.54 | | | | | |
| Mean | 2.48 | 1.56 | 1.53 | 1.32 | | 4.74 | 2.32 | 3.28 | 1.32 |
| Standard deviation | 1.81 | 1.40 | 1.19 | 1.62 | | .16 | 1.10 | 1.12 | .28 |

Table 51: Community Quality Indices for perennial vegetation along two pipelines constructed in 1963 and 1970. A = control; B = berm; C = trench; D = roadedge.

POWERLINES

| Area | 1963 Transect A | B | C | D | Area | 1970 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .17 | .04 | .005 | .05 | 1 | 3.34 | .45 | .80 | .09 |
| 2 | 1.08 | 2.79 | 2.10 | 1.51 | 2 | 3.05 | .14 | .12 | .14 |
| 3 | 4.47 | 3.08 | 2.54 | 5.91 | 3 | 4.36 | .00 | .00 | .00 |
| 4 | 4.66 | 5.99 | 2.19 | 1.29 | 4 | 2.40 | .69 | .62 | 1.18 |
| 5 | .26 | .55 | 1.81 | 2.48 | 5 | 2.82 | 1.90 | 1.56 | 2.62 |
| 6 | 2.39 | 2.14 | 1.22 | 2.67 | 6 | 4.74 | .08 | .03 | 1.93 |
| 7 | 4.67 | 1.29 | 2.47 | 1.94 | 7 | 2.23 | .09 | .22 | 1.08 |
| 8 | 3.00 | .25 | 1.27 | 2.31 | | | | | |
| Mean | 2.59 | 2.02 | 1.70 | 2.27 | | 3.28 | .48 | .48 | 1.01 |
| Standard deviation | 1.92 | 1.97 | .84 | 1.69 | | .95 | .67 | .56 | 1.01 |

Table 52: Community Quality Indices for perennial vegetation along two power transmission lines constructed in 1924 and 1977. A = control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1924 Transect A | B | C | D | Area | 1977 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.59 | 3.62 | 4.53 | 7.26 | 1 | 2.81 | 1.50 | 1.20 | 2.77 |
| 2 | 6.93 | 8.36 | 4.56 | 11.06 | 2 | 3.44 | 3.97 | 1.36 | 6.83 |
| 3 | 4.27 | 4.85 | 2.12 | 1.94 | 3 | 4.54 | 1.07 | .55 | 2.82 |
| 4 | 4.91 | 1.08 | 3.27 | 3.04 | 4 | 4.18 | 3.53 | .85 | 4.04 |
| 5 | 4.63 | 3.62 | 3.22 | 6.21 | 5 | 5.52 | 3.87 | 2.31 | 4.19 |
| 6 | 4.91 | 3.86 | 3.70 | 5.17 | 6 | 2.10 | 1.40 | 1.03 | 2.59 |
| 7 | 1.55 | 1.41 | 1.01 | .15 | | | | | |
| Mean | 4.54 | 3.83 | 3.20 | 4.98 | | 3.77 | 2.56 | 1.22 | 3.87 |
| Standard deviation | 1.58 | 2.42 | 1.28 | 3.65 | | 1.24 | 1.37 | .60 | 1.60 |

Table 53: Community Quality Indices for perennial vegetation along two power transmission lines constructed in 1924 and 1968. Study areas 4, 3 and 7, 1924 occur beside areas 3, 4 and 5 respectively of the 1968 line. A = control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1924 Transect A | B | C | D | | 1968 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | 1 | 7.08 | 3.61 | 3.90 | 5.14 |
| | | | | | 2 | 2.46 | 2.34 | .66 | 2.04 |
| 4 | 4.91 | 1.08 | 3.27 | 3.04 | 3 | 4.91 | 3.49 | 10.89 | 3.04 |
| 3 | 4.27 | 4.85 | 2.12 | 1.94 | 4 | 4.72 | 4.28 | 4.26 | 1.94 |
| 7 | 1.15 | 1.41 | 1.01 | .15 | 5 | 1.55 | 1.31 | .45 | .15 |
| Mean | 3.56 | 2.45 | 2.13 | 1.71 | | 4.14 | 3.01 | 4.03 | 2.46 |
| Standard deviation | 1.81 | 2.09 | 1.13 | 1.46 | | 2.18 | 1.18 | 4.22 | 1.82 |

POWERLINES

| Area | 1933 Transect A | B | C | D | Area | 1969 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 2.46 | 1.36 | 3.25 | 2.60 | 1 | 4.51 | 1.63 | 1.35 | .59 |
| 2 | 7.65 | 3.37 | 5.31 | 4.81 | 2 | 3.64 | 1.74 | 1.40 | .48 |
| 3 | 1.52 | .00 | 3.73 | 1.43 | 3 | 8.28 | 7.49 | 10.62 | 13.28 |
| 4 | 2.96 | 2.08 | 2.19 | 2.35 | 4 | 1.86 | 1.66 | 2.72 | 2.27 |
| 5 | 1.56 | 1.68 | 1.98 | 2.18 | 5 | 4.59 | 4.17 | 4.45 | 6.38 |
| 6 | 4.13 | 7.53 | 2.44 | 4.06 | 6 | 4.36 | 2.22 | 2.43 | 4.55 |
| 7 | 2.21 | 1.78 | 1.26 | 2.21 | 7 | 4.41 | 5.09 | .56 | .89 |
| Mean | 3.21 | 2.97 | 2.88 | 2.81 | | 4.52 | 3.47 | 3.37 | 4.06 |
| Standard deviation | 2.15 | 2.34 | 1.35 | 1.19 | | 1.92 | 2.34 | 3.44 | 4.63 |

Table 55: Community Quality Indices for perennial vegetation along two powerlines constructed in 1944 and 1952. A= control; B = wire; C = pylon; D = roadedge.

POWERLINES

| Area | 1944 Transect A | B | C | D | Area | 1952 Transect A | B | C | D |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 4.05 | 2.76 | 4.01 | 1.35 | 1 | 9.89 | 8.20 | 5.94 | 3.19 |
| 2 | 1.35 | 1.71 | 1.37 | 1.78 | 2 | 3.67 | 3.93 | 3.15 | 2.93 |
| 3 | 2.63 | 5.14 | 10.02 | 5.90 | 3 | 6.76 | 3.89 | 3.29 | 4.56 |
| 4 | 7.65 | 4.06 | 2.84 | 6.34 | 4 | 4.55 | 7.20 | 2.14 | 2.14 |
| 5 | 2.94 | 3.86 | 3.21 | 8.26 | 5 | 5.41 | 4.94 | 3.67 | 3.09 |
| 6 | 2.98 | 3.10 | 2.10 | 2.63 | 6 | 5.26 | 4.35 | 1.38 | 3.66 |
| 7 | 2.30 | 2.62 | 2.74 | 2.79 | 7 | 4.68 | 5.30 | 2.80 | 5.79 |
| 8 | 2.06 | 1.69 | 2.09 | 3.08 | 8 | 6.64 | 6.15 | 4.03 | 4.59 |
| 9 | 2.48 | 1.85 | 1.75 | 3.41 | | | | | |
| 10 | 5.42 | 4.89 | 3.30 | 2.81 | | | | | |
| Mean | 3.39 | 3.17 | 3.34 | 3.83 | | 5.86 | 5.49 | 3.30 | 3.74 |
| Standard deviation | 1.87 | 1.28 | 2.48 | 2.23 | | 1.93 | 1.57 | 1.36 | 1.17 |

Table 56: Community Quality Indices for perennial vegetation along the two Los Angeles aqueducts constructed in 1913 and 1970. A = control; B = right-of-way; C = roadedge.

AQUEDUCTS

| Area | 1913 Transect A | 1913 Transect B | 1913 Transect C | Area | 1970 Transect A | 1970 Transect B | 1970 Transect C |
|---|---|---|---|---|---|---|---|
| 1 | 5.92 | 1.57 | 1.63 | 1 | 3.52 | 1.89 | .80 |
| 2 | 4.53 | 7.96 | 3.72 | 2 | 5.26 | 1.83 | 3.72 |
| 3 | 7.01 | 2.77 | 2.57 | 3 | 5.93 | 2.43 | 3.72 |
| 4 | 12.24 | 10.82 | 3.54 | 4 | 3.93 | .66 | .52 |
| 5 | 2.04 | 9.50 | 18.80 | 5 | 2.51 | .00 | .00 |
| 6 | 9.14 | 12.93 | 5.26 | 6 | 12.24 | 4.61 | 4.93 |
| 7 | .62 | 8.75 | .83 | 7 | 2.04 | 6.53 | 2.89 |
| 8 | 4.67 | 1.91 | 2.39 | 8 | 9.14 | 4.09 | 9.06 |
| 9 | 3.03 | 6.11 | 8.04 | 9 | .62 | .60 | .00 |
| 10 | 4.90 | .90 | 1.91 | 10 | 2.75 | .00 | .32 |
| 11 | 2.06 | 3.01 | 5.28 | 11 | 4.67 | .89 | 2.16 |
| | | | | 12 | 2.39 | 1.08 | .62 |
| | | | | 13 | 5.33 | .95 | 1.24 |
| | | | | 14 | 4.57 | .05 | .07 |
| | | | | 15 | 2.05 | .81 | .84 |
| Mean | 5.10 | 6.02 | 4.91 | | 4.46 | 1.76 | 2.06 |
| Standard deviation | 3.39 | 4.20 | 5.04 | | 2.98 | 1.91 | 2.49 |

Table 57: Three-way Analysis of Variance for CQI Values for study areas 1-6 of table 49. SS = sum of squares; df = degrees of freedom; MS = mean square; F = variance ratio; Sig. = relative significance; NS = not significant; .05, .01, .001 = levels of probability listed in order of increasing significance. * = corrected value of F for A variation.

| Source of Variation | Pipelines 1956, 1973 Six Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - pipelines | 4.25 | 1 | 4.25 | *2.15 | NS |
| B - transects | 26.74 | 3 | 8.91 | 10.10 | <.001 |
| C - study areas | 10.27 | 5 | 2.05 | 2.32 | NS |
| First order interaction | | | | | |
| AB | 3.61 | 3 | 1.20 | 1.36 | NS |
| AC | 5.60 | 5 | 1.12 | 1.27 | NS |
| BC | 14.50 | 15 | .97 | 1.10 | NS |
| Second order interaction | | | | | |
| ABC | 13.23 | 15 | .88 | | |
| *Variation among areas within corridors | | | | | |
| AC + C | 15.87 | 8 | 1.98 | | |

Table 58: Three-way Analysis of Variance for CQI Values for study areas 1-6 of table 51. Headings as in table 57.

| Source of Variation | Pipelines 1963, 1970 Six Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - pipelines | 7.57 | 1 | 7.57 | *1.59 | NS |
| B - transects | 15.21 | 3 | 5.07 | 3.96 | <.05 |
| C - study areas | 28.60 | 5 | 5.72 | 4.47 | <.05 |
| First order interaction | | | | | |
| AB | 12.99 | 3 | 4.33 | 3.38 | <.05 |
| AC | 18.99 | 5 | 3.80 | 2.97 | <.05 |
| BC | 13.41 | 15 | .89 | .70 | NS |
| Second order interaction | | | | | |
| ABC | 19.15 | 15 | 1.28 | | |
| *Variation among areas within corridors | | | | | |
| AC + C | 47.59 | 10 | 4.76 | | |

Table 59: Three-way Analysis of Variance for CQI Values for study areas 1-6 of table 52. Headings as in table 57.

| Source of Variation | Powerlines 1924-1977 Six Sample Sites | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - powerlines | 38.95 | 1 | 38.95 | *5.23 | <.05 |
| B - transects | 42.69 | 3 | 14.23 | 12.80 | <.001 |
| C - study areas | 50.3 | 5 | 10.06 | 9.05 | <.001 |
| First order interaction | | | | | |
| AB | 1.83 | 3 | .61 | .05 | NS |
| AC | 24.05 | 5 | 4.81 | 4.33 | <.05 |
| BC | 30.6 | 15 | 2.04 | 1.84 | NS |
| Second order interaction | | | | | |
| ABC | 16.65 | 15 | 1.11 | | |
| *Variation among study sites within corridors | | | | | |
| AC + C | 74. | 10 | 7.44 | | |

Table 60: Three-way Analysis of Variance for CQI Values of table 53. Study areas 3, 4 and 7 of the 1924 powerline occur beside areas 4, 3 and 5 of the 1968 line respectively. Headings as in table 57.

| Source of Variation | Powerlines 1924, 1968 - Three Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - powerlines | 5.45 | 1 | 5.45 | 2.71 | NS |
| B - transects | 15.46 | 3 | 5.15 | 2.56 | NS |
| C - study areas | 50.34 | 2 | 25.17 | 12.52 | <.01 |
| First order interaction | | | | | |
| AB | 9.20 | 3 | 3.07 | 1.53 | NS |
| AC | 7.00 | 2 | 3.50 | 1.74 | NS |
| BC | 23.69 | 6 | 3.95 | 1.97 | NS |
| Second order interaction | | | | | |
| ABC | 12.08 | 6 | 2.01 | | |

Table 61: Three-way Analysis of Variance for CQI Values for study 1-6 of table 54. Headings as in table 57.

| Source of Variation | Powerlines 1933-1969 Six Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - powerlines | 6. | 1 | .6 | *.08 | NS |
| B - transects | 10.7 | 3 | 3.36 | 1.88 | NS |
| C - study areas | 24.07 | 5 | 4.81 | 2.69 | NS |
| First order interaction | | | | | |
| AB | 1.7 | 3 | .59 | .33 | NS |
| AC | 46.96 | 5 | 9.39 | 5.25 | <.01 |
| BC | 26.46 | 15 | 1.76 | .98 | NS |
| Second order interaction | | | | | |
| ABC | 26.90 | 15 | 1.79 | | |
| *Variation among areas within corridors | | | | | |
| AC + C | 71.03 | 10 | 7.1 | | |

Table 62: Three-way Analysis of Variance for CQI Values for study areas 1-6 of table 55. Headings as in table 57.

| Source of Variation | Powerlines 1944, 1952 - Six Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Size |
| Main effects | | | | | |
| A - powerlines | 4.78 | 1 | 4.78 | *.55 | NS |
| B - transects | 10.45 | 3 | 3.48 | 1.19 | NS |
| C - study areas | 46.85 | 5 | 9.37 | 3.20 | <.05 |
| First order interaction | | | | | |
| AB | 28.22 | 3 | 9.41 | 3.21 | NS |
| AC | 38.84 | 5 | 7.77 | 2.65 | NS |
| BC | 46.09 | 15 | 3.07 | 1.05 | NS |
| Second order interaction | | | | | |
| ABC | 43.92 | 15 | 2.93 | | |
| *Variation among areas within corridors | | | | | |
| AC + C | 85.7 | 10 | 8.75 | | |

Table 63: Analysis of Variance for CQI Values of table 56. Study areas 1, 4, 5, 7, 8, 9 and 11 of the 1913 aqueduct occur beside areas 1, 6, 7, 9, 11, 12 and 15 of the 1970 aqueduct respectively. Headings as in table 57.

| Source of Variation | Aqueducts 1913-1970 Seven Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - aqueducts | 72.22 | 1 | 76.22 | 9.16 | <.05 |
| B - transects | 1.36 | 2 | .68 | .08 | NS |
| C - study areas | 217.38 | 6 | 36.23 | 4.36 | <.05 |
| First order interaction | | | | | |
| AB | 27.12 | 2 | 13.56 | 1.63 | NS |
| AC | 38.1 | 6 | 6.35 | .76 | NS |
| BC | 197.04 | 12 | 16.42 | 1.97 | NS |
| Second order interaction | | | | | |
| ABC | 99.84 | 12 | 8.32 | | |

Table 64. Three-way Analysis of Variance for CQI Values of table 56. Study areas 2, 3, 9 and 10 of the 1913 aqueduct are compared with areas 2, 3, 4 and 5 of the 1970 aqueduct respecitvely. Headings as in table 57.

| Source of Variation | Aqueducts 1913, 1970 - Four Sample Areas | | | | |
|---|---|---|---|---|---|
| | SS | df | MS | F | Sig. |
| Main effects | | | | | |
| A - aqueducts | 12.53 | 1 | 12.53 | * .58 | NS |
| B - transects | 36.94 | 2 | 18.47 | 4.38 | NS |
| C - study areas | 87.59 | 3 | 29.20 | 6.92 | <.05 |
| First order interaction | | | | | |
| AB | 24.49 | 2 | 12.25 | 2.90 | NS |
| AC | 42.18 | 3 | 14.06 | 3.33 | NS |
| BC | 22.58 | 6 | 3.76 | .89 | NS |
| Second order interaction | | | | | |
| ABC | 25.33 | 6 | 4.22 | | |
| *Variation among areas within corridors | | | | | |
| AC + C | 129.77 | 6 | 21.63 | | |

Table 65: Summary analysis of mean ($\overline{X}$) percent change ($\Delta\%$) values for biomass columns of tables 8-22. Neg, Pos = negative and positive change respectively. N = number of means sampled.

Δ% biomass

Total Pipelines

| Values | Transects | | | | | |
|---|---|---|---|---|---|---|
| | Berm | | Trench | | Roadedge | |
| | Pos | Neg | Pos | Neg | Pos | Neg |
| N | 3. | 32 | 2 | 34 | 8 | 28 |
| $\overline{X}$ | 93.66 | 63.42 | 84.0 | 68.35 | 35.34 | 60.21 |
| Standard error of $\overline{X}$ | 47.32 | 5.12 | 71.63 | 4.01 | 13.9 | 4.96 |

Total powerlines

| | Wire | | Pylons | | Roadedge | |
|---|---|---|---|---|---|---|
| | Pos | Neg | Pos | Neg | Pos | Neg |
| N | 17 | 33 | 11 | 39 | 12 | 38 |
| $\overline{X}$ | 40.88 | 36.36 | 70.91 | 48.97 | 110.08 | 46.38 |
| Standard error of $\overline{X}$ | 7.57 | 3.88 | 29.33 | 3.54 | 31.14 | 3.80 |

Total aqueducts

| | Right-of-way | | Roadedge | |
|---|---|---|---|---|
| | Pos | Neg | Pos | Neg |
| N | 7 | 19 | 5 | 21 |
| $\overline{X}$ | 65.86 | 68.16 | 112.4 | 58.09 |
| Standard error of $\overline{X}$ | 37.58 | 3.80 | 30.83 | 6.70 |

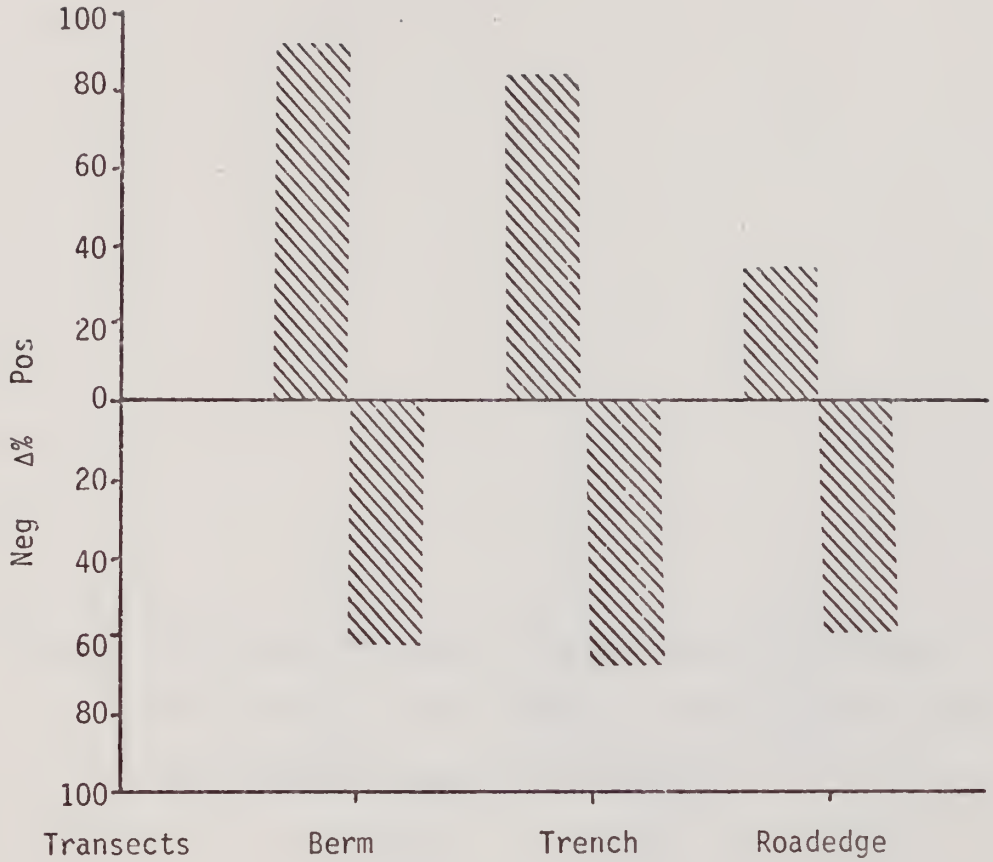
Table 65 contd

Total corridors - Transect summed

| | Pos | | Neg | |
|---|---|---|---|---|
| | Corridors | Transects | Corridors | Transects |
| N | 14 | 65 | 15 | 229 |
| $\overline{X}$ | 53.33 | | 54.34 | |
| Standard error of $\overline{X}$ | 11.28 | | 3.55 | |

Fig. 6: Bar graph of summary mean ($\overline{X}$) percent change ($\Delta\%$) values for biomass of total pipelines from table 55. See table 65 for N and standard error of $\overline{X}$.

Fig. 7: Bar graph of summary mean percent change values for biomass of total powerlines from table 65.


100
80
60
40
20
0
20
40
60
80
100
Pos
Δ%
Neg
Transects
Berm
Trench
Roadedge

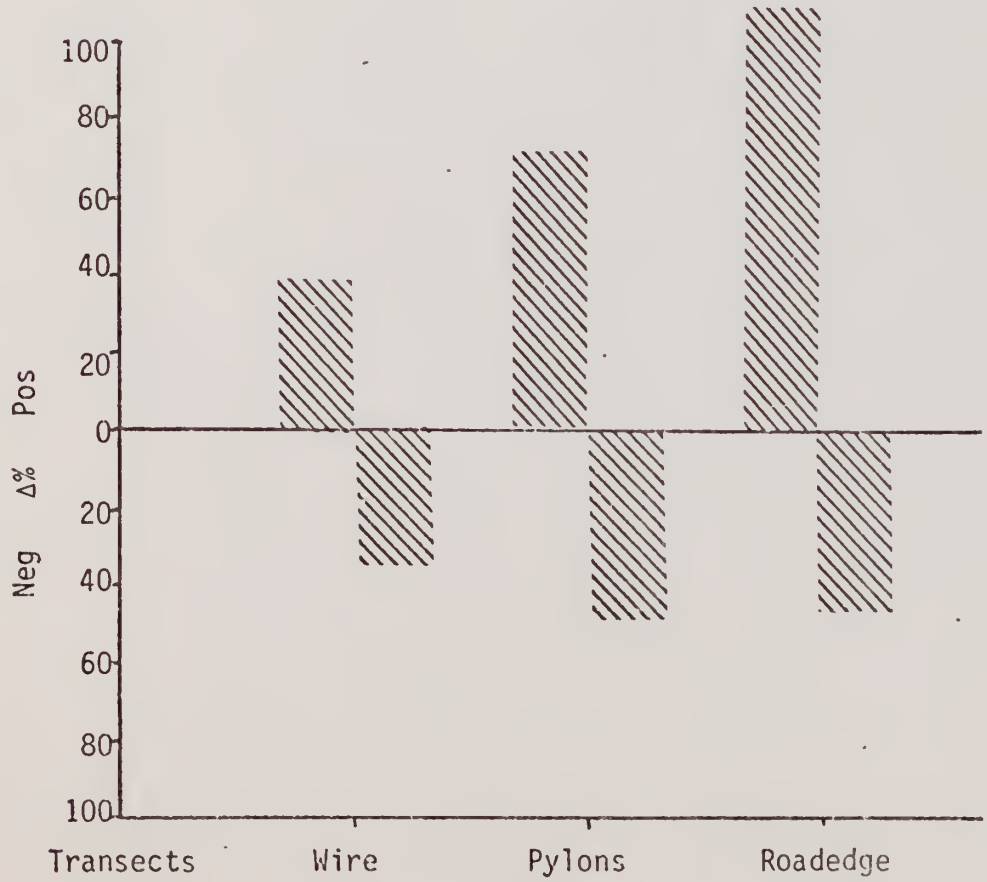
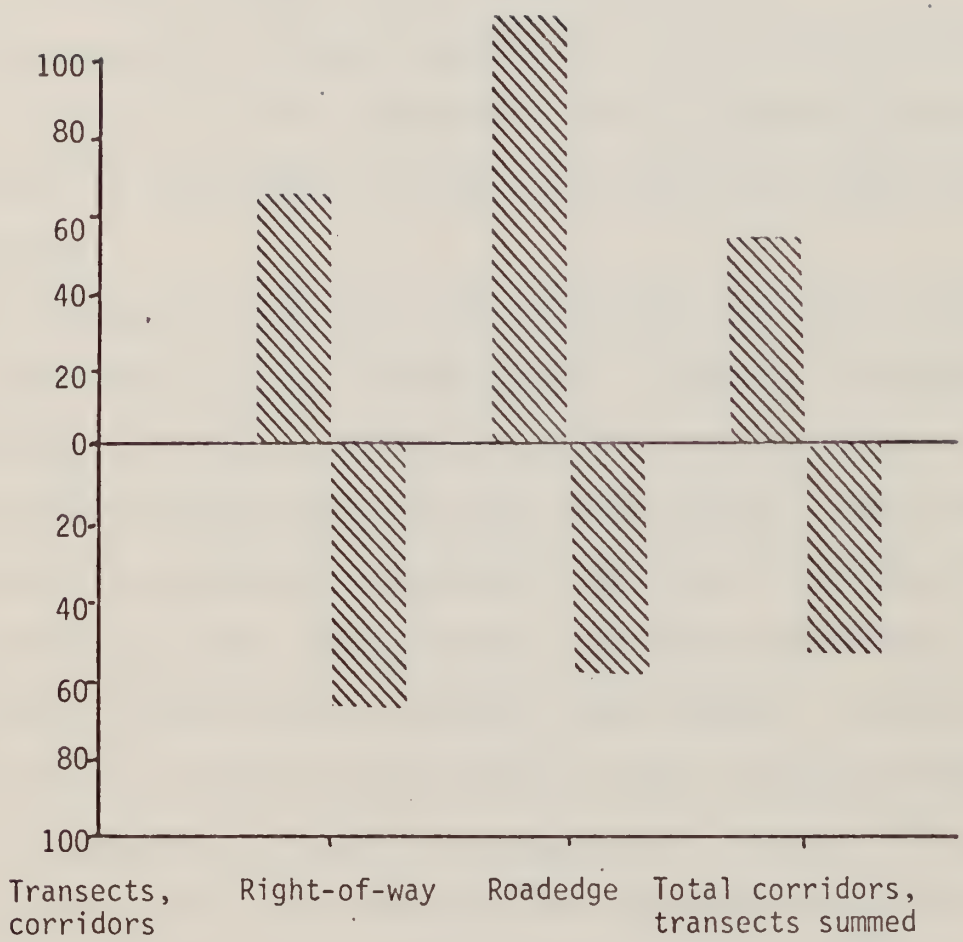

100
80
60
40
20
0
20
40
60
80
100
Pos
Δ%
Neg
Transects
Wire
Pylons
Roadedge

Fig. 8: Bar graph of summary mean percent change values for biomass of total aqueducts and total corridors and transects summed from table 65.


100
80
60
40
20
0
20
40
60
80
100
Transects, corridors
Right-of-way
Roadedge
Total corridors, transects summed

# RESULTS AND CONCLUSIONS

Criteria for determining plant response to utility construction, as indicated in the introduction, is to be primarily a comparison of productivity, diversity and stability in disturbed and control transects. Thus it is to these features that we should look first.

These parameters have been measured and are outlined in a variety of tables. However, it is also necessary to look at occassional unmeasured observations to help attempt to explain some things not brought out in measurements.

Four measures of perennial plant productivity are given in tables 8-22; ground cover; density; volume; biomass. Diversity is estimated from measures of richness, evenness, equibility and application of diversity index incorporating the previous three measures (Tables 23-25). Stability of the vegetation is estimated from values of relative biomass and relative age (Tables 26-40), transect similarity coefficients (Tables 41-48) and by community quality indices (Tables 49-56). To help ascertain the significance of the variables studied, namely, utility corridors (year of construction), transects and study areas, the data for the Community Quality Indices was analyzed by eight three-way analysis of variance tests (Tables 57-68). Lastly, a summary analysis of mean percent change values for plant biomass of tables 8-22 is shown in table 65 and figures 7, 8 and 9. Observations of these tables will help to evaluate the impact of utility construction on the perennial vegetation. Primary comparisons should be among the classes of transects at each study site, secondary comparisons should be among study areas within corridors, and lastly between corridors.

Tables 8-22 may be used for estimating productivity by comparing the parameters of ground cover, density, volume, biomass and percent change. Control and disturbed transects study areas and corridors may be compared.

Diversity measures are listed in tables 23-25. Four measures of diversity, explained in the methods section, are used: richness; equibility (values range from 0 + ∞); evenness (values range from 0 - 1%); diversity index (values range from 0 - + ∞). Transects study areas and corridors, likewise may be compared.

Stability among transects, study areas and corridors may be estimated by observing tables 26-40 for relative biomass and relative age values, tables 41-48 for coefficient of similarity for transects and tables 49-56 for community quality indices. Values for coefficient of similarity range from 0 - 1. Values of the community quality index range from 0 - + ∞.

Data of the community quality index (CQI) was treated to three-way analysis of variance tests. Corridors (year of construction) A, transects B and study areas C were compared. The results are shown, mainly in the form of significance values, in tables 57-64. Significance levels range from NS = not significant to $P<.05$, $P<.01$, and $P<.001$, in order of increasing significance. Two corridors of different ages of construction were compared in each of eight tests. As a direct source of variation among CQI values (tables 49-56), only the 1924-1977 powerlines and the 1913-1970 aqueducts reached significance at the 5 percent ($P<.05$) probability level for paired corridors (A). All other corridor pairs were not significant (NS). The direct effects attributable to the different

transects (B) were significant at the 0.1, 0.5 and 0.1 percent probability level for the 1956-1973 and 1963-1970 pipelines and for the 1924-1977 powerline respectively. The remaining eight corridor pairs were NS for transects. The main effects due to differences in the several study areas (C) were significant for the corridors: 1963 -1970 ($P<0.05$); 1924-1977 ($P<0.001$); 1924-1968 ($P<0.01$) 1944-1952 ($P<0.05$); 1913-1970 (both sets) ($P<0.05$).

The first order interaction between the AB paired variation source was significant only for the 1963-1970 ($P<0.05$) pipeline. The interaction between AC paired variation source was significant for the 1963-1970 pipeline ($P<0.05$) and for the 1924-1977 and 1933-1969 powerlines, ($P<0.05$ and $P<0.01$ respectively). The BC interaction was NS for all corridor combinations.

There are many categories of NS among the sources of variation in the eight sets of paired corridors. Perhaps most of these are truly not significant but I feel that if there was a better way to incorporate quality factors into the data used for analysis the picture might look different. Disturbance brought about by construction of the utilities may enhance the vegetation as far as cover, density, and even biomass goes, and these parameters are easily measured and quantified. However, when invader species and other less desirable species, such as Chrysothammus sp. fill in the spaces previously taken by dominants of the control transects, differences in transect quality is much harder to document. Observing percentage composition comparisons with an eye for ecological significance of the species should supplement most of the quantitative data.

The variation between study areas was significant for at least one of the levels of probability in six of the eight corridor pairs. This is particularly significant for corridor pairs 1924-1968 and 1913-1970. The study areas (3 in the former and 7 in the latter corridor pairs) were side by side where the corridors ran together. We interpret this to mean that the differences in the year of corridor construction is having its effect on the vegetation of the side by side study areas, perhaps contributing to the differences which are significant.

It is also of interest to note that Vasek, et. al., (1975b) reported NS for A (comparing 1937-1970 powerlines) in their three-way analysis of variance test. All of our main effects of source variation A (corridor years) showed NS also for time spans within the range reported by Vasek et. al.

However, both our 1924-1977 powerline and the 1913-1970 aqueduct corridor pairs were significant ($P<0.05$) for the main effect of source variation A. We interpret this to indicate that given enough time span, significant differences will show up in the vegetation of the two corridors. Perhaps the vegetation of the disturbed transects of the older corridor has revegetated sufficiently to provide a greater contrast to the vegetation of the more recently disturbed transects of the younger live.

First order interactions were less significant than the main effects but three of the tests for AC were significant ($P<0.05$, 1963-1970; $P<0.05$, 1924-1977; $P<0.01$, 1933-1969) and only one for AB ($P<0.05$, 1963-1970).

Visual scanning of the several other tables will allow for evaluation of differences due to construction in the various transects, corridors and study areas. Perennial plant ground cover values of tables 8-22 are highly variable, ranging from >1 to 19 percent for all transects (N = 425) with a mean of 3.67 percent and a standard deviation of 2.60. This percent cover is low compared to Vasek et. al., (1975a and 1975b) where mean ground covers of 6.40 and 19.05 percent respectively are reported. The mean value of 6.40% (N=40) had a standard deviation of 5.60. The 19.05% mean (N=54) had a standard deviation of 10.74.

The differences in mean percent ground cover perhaps can be explained by the nature of the vegetation of the N transects. The N = 40 of Vasek et. al. were all in Creosote bush scrub through Lucerne Valley where vegetation cover is generally greater than in the desert at large. The N = 54 were likewise sampled primarily in Creosote bush but included some Salt bush scrub and Joshua tree woodland. Our N = 425, sampled a wide variety of plant communities and land forms where sparse dry playas, rocky pavement hills, riverwashes, etc., perhaps function to cut down the average ground cover.

These differences in ground cover, however, do not affect the relative values which are sought in an evaluation of distrubance due to construction practices.

In comparing our overall results with those of Vasek et. al., (1975a, 1975b) and Johnson et. al., (1975), their conclusions regarding relative enhancement of vegetation due to construction in some transects and drastic disturbance in others, seem to compare favorably with our findings.

In assessing productivity ratios (PR) of tables 8-22, negative PR values (<1) of some transects are often balanced out by positive PR values ($\overline{>}$ 1) in other transects of the same study site. Likewise different study areas may balance each other out in the same manner as do the side by side transects. Corridors with different dates of construction and geographic location also tend to balance out in some cases.

This trend seems to be apparent throughout all the parameters of the productivity, stability and diversity tables. Table 65 and figure 6 seem to bear out this point. Here the total corridors (N =15) and total BCD transects (N=294) are analyzed for $\Delta$% of the biomass vlaues of tables 8-22. The mean positive change of plant biomass due to construction practices in the B, C and D transects (N=65) for all corridors (N=14) was 53.33 percent. The mean negative change of plant biomass in the same B, C and D transects (N=229) for all corridors (N=15) was 54.34 percent.

Before one might be tempted to say the perennial vegetation of the Mohave Desert is holding its' own against utility construction, the quality of the vegetation change must be looked at closely.

Is the drastic disturbance encountered in some transects, such as under pylons and over trenchs, really balanced out, ecologically speaking, by relative enhancement under wires and along road edges? Is it more important to look at "what" is there more so than just "how much" is there? Relative biomass and relative age tables (tables 26-40) are valuable for this purpose because they show the percent of biomass for several of the dominant long-lived perennials and the total percent of long-lived and short-lived perennials. Based on the assumption that the long-lived perennials are the ones which are dominant in the natural

undisturbed community, their ranges of tolerance to the environmental factors perhaps make them best suited for the community. Invader species, often short-lived, are generally transient in the community and do not necessarily lend themselves to a high quality community. Many of the short-lived species, however, are not invader species but are sub-dominants in the undisturbed community. Larrea tridentata, Ambrosia dumosa and Atriplex sp. are characteristic long-lived species generally thought of as good quality dominants in many desert communities. (Vasek, et. al., 1975a, 1975b, Johnson, et. al., 1975). Hymenoclea salsola is often a dominant species in desert washes and it's presence is enhanced in other disturbed situations as well. Percent composition of these species are shown in tables 26-40. The full list of species encountered in the various transects sampled are shown by their relative age in table 7. Chrypothamnus paniculatus is also considered to be a long-lived perennial (Vasek, et. al., 1975b). However, presence of Chrysothamnus sp. in many of our disturbed transects, particularly along corridors on Baldy Mesa and above Dove Springs, encourages me to consider it as a long-lived invader. Presence of this species in a transect would enhance the community quality via use of the Community Quality Index. Thus it is important to consider percentage composition and to have a feeling for the worth of a particular species in the community.

In summary, in general analysis of field observations and transect data tables there appears to be highly variable impacts on perennial vegetation in relation to utility construction in the Mohave Desert.

Distrubance tends to generate new and fresh plant growth which shows up as cover and biomass in transect computations which rely heavily

on these quantitative values. This enhancement of vegetation in disturbed transects often balances out the cover and biomass destroyed by the original disturbance.

There are many study areas where sharp differences show up in comparing control and disturbed transects as well as difference attributable to different age spans of construction dates. There are also many distrubed and control transects which, due to stimulation by disturbance may be near equal as far as density, cover and even biomass goes. Situations of this type may appear to be a balance between enhancement and drastic disturbance when comparing many areas overall. However, the qualitative implications are harder to acertain. It is apparent that percentage composition, at least of the dominant long-lived perennials, is a good measure to supplement other comparisions. Other qualitative tests are valuable as well, i.e., C $C_j$ and CQI tables.

In overall and long-term effects of utility corridor construction, there is variable effects of enhancement of vegetation along roadedges, slight enhancement under wires of powerlines and over trenches of pipelines. Under pylons of powerlines seem to receive the greatest damage and also the most variable of vegetation recovery. Significant differences between years of construction are noticible where the time span has allowed for considerable regrowth of the older corridor.

Depending on soil type, land form and other physical features of disturbed sites, vegetation recovery progresses at variable rates and stages. Drastic disturbance in one area or transect site may impede vegetation recovery, whereas slight distrubance might enhance vegetation in another, tending to offset the effect of the drastic disturbance (table 65, figure 8). Apparent similarities of vegetation cover and density of disturbed and control situtations, however, often are

not similar when looking at qualitative aspects, such as porportion of long-lived species and presence of characteristic dominants of undisturbed communities.

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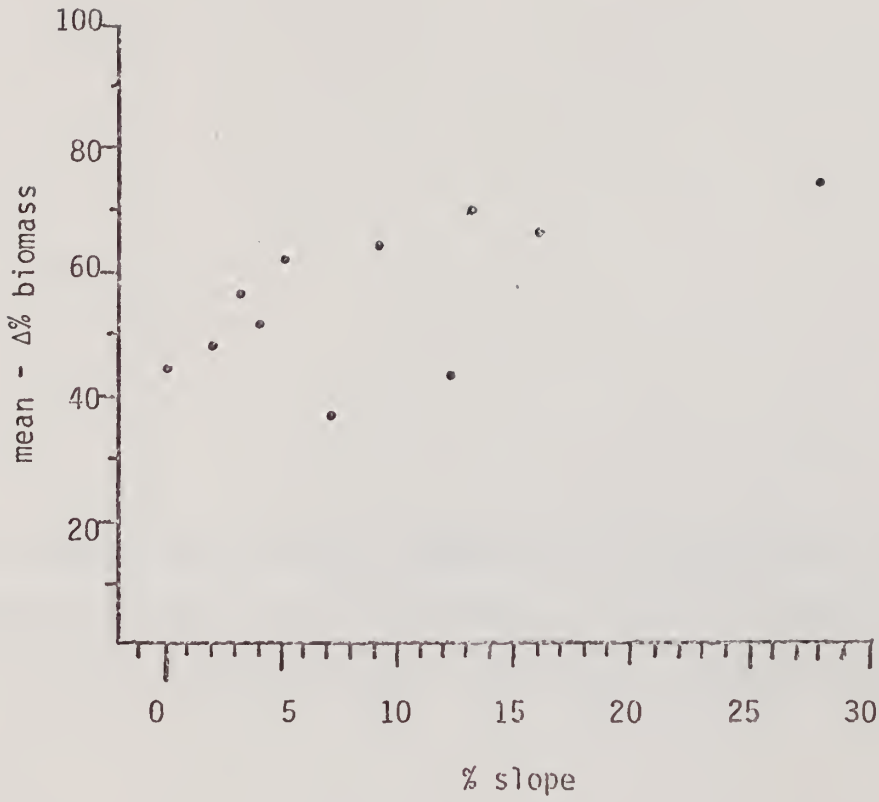
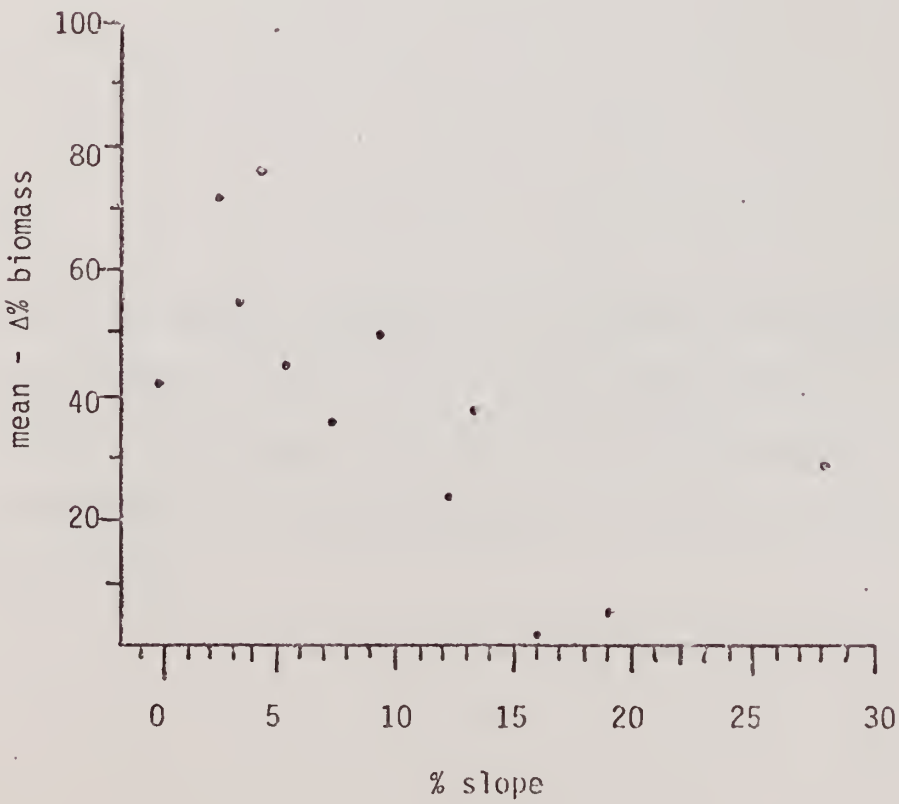
## Appendix A

Fig. 1. Linear regression analysis for pylon transects (n=50) of power transmission corridors (n=7) in the Mohave Desert, California. r = +.6138 for transect means (n=11); decision point = .602.

Fig. 2. Linear regression analysis for roadedge transects (n=50) of power transmission corridors (n=7) in the Mohave Desert, California. r = -.6535 for transect means (n=12); decision point = .576.


100
80
60
40
20
mean - Δ% biomass
0
5
10
15
20
25
30
% slope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% slope

Fig. 9: View looking south across a desert wash of Creosote bush scrub showing the right-of-way of the 1970 Los Angeles aqueduct near the entrance to Jawbone Canyon. Photograph taken July 17, 1978.

Fig. 10: The 1970 Los Angeles aqueduct at the entrance to Dove Springs showing Creosote bush scrub on a gentle north facing fan. Photograph, taken August 24, 1978, shows a high density of Chrysothamnus sp. and Lepidospartum sp. in the right-of-way in mid picture.

Fig. 11: South facing slope of a rocky hill supporting a sparse cover of Creosote bush scrub along the 1970 Los Angeles aqueduct in Jawbone Canyon. Photographed July 17, 1978.

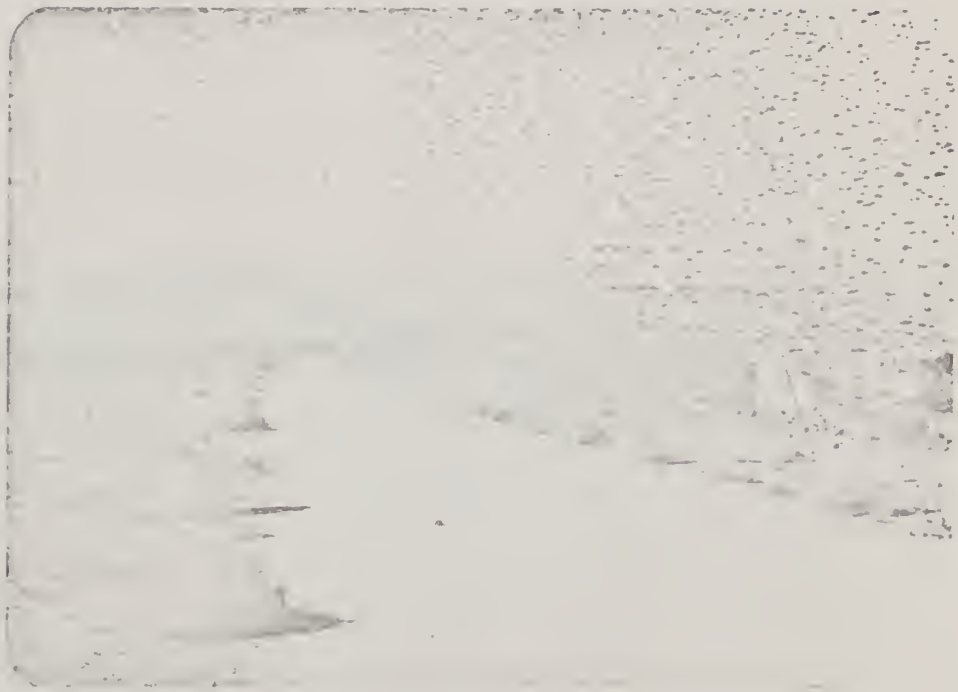
Fig. 12: Right of way through Joshua tree woodland along the 1970 Los Angeles aqueduct. The cleared lane to the left is the cement roof of the aqueduct conduit. The utility access road is shown in the center. Photographed August 24, 1978, 7.2km west of Mohave, California.

Fig. 13: Steep east facing slope of Creosote bush scrub showing the 1913 Los Angeles aqueduct (center), right-of-way (left) and access road to the right. Photographed September 19, 1978 approximately 12km NW of Inyokern, California in Grapevine Canyon.

Fig. 14: Southeast facing fan with Creosote bush scrub showing the 1970 Los Angeles aqueduct in Grapevine canyon.

Fig. 15: Riverwash of the Mohave river approximately 6km east of Dagget, California showing the towers of the 1944 powerline. Photographed July 6, 1978.

Fig. 16: Dissected fan with Creosote bush scrub 3.22km north of Victorville, California. The three lines of the 1944 powerline are shown. Photographed August 31, 1978.



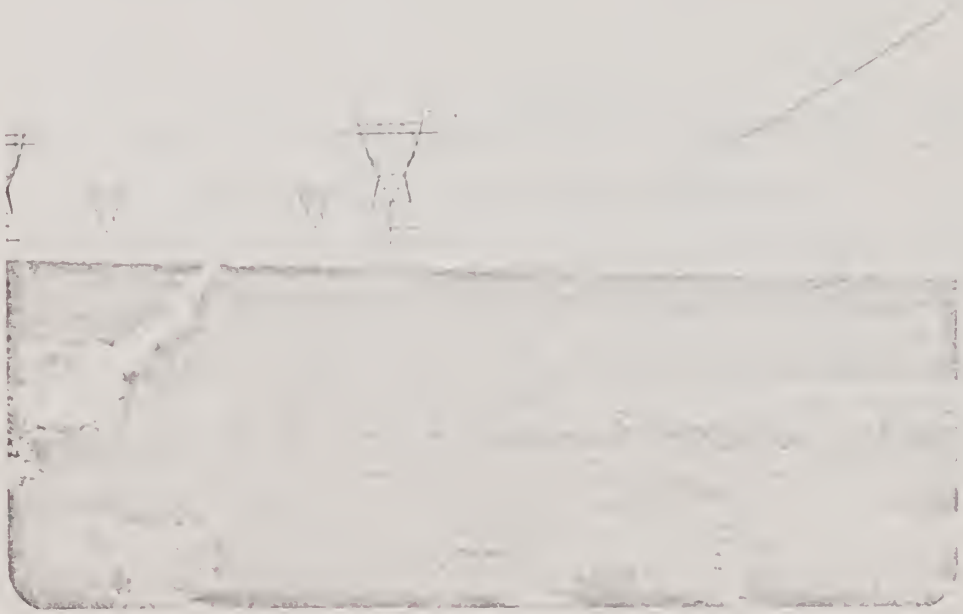


Fig. 17: Rocky hill site in Creosote bush scrub showing the area under the pylons of the 1952 powerline. Jawbone canyon, August, 1978.

Fig. 18: Rocky hill site showing desert holly scrub along the 1952 powerline 1.6km south of Jawbone canyon, July 17, 1978.

Fig. 19: Alkali scrub over a lava bed at Troy Lake 48.3km west of Barstow, California on I-40. The pile of lava in the center of the picture is the trench, with the berm to the right and access road on the left of the 1963 Pacific Gas and Electric pipeline. Photograph taken August 7, 1978.

Fig. 20: Mixed mountain scrub community on a steep east facing slope of Stoddard Ridge 19.3km south of Barstow California on the Barstow-Lucerne Valley road. The trench of the 1956 pipeline occurs just to the right of the access road shown. Photographed August 30, 1978.

Fig. 21: Sand covered east facing fan showing a dense cover of *Hilaria rigida* in a creosote bush community. The trench and berm of the 1973 Cal-Neva pipeline just visible in the left-lower corner of the photograph, taken September 14, 1978, 32km SE of Baker, California.

Fig. 22: Dune sand plant community on a sand dune above the Mohave river 3.2km W of Dagget, California. The berm of the 1970 Cal-Neva pipeline is shown in the center of the picture with the trench to the left side. The access road can be seen at the far right. Photograph taken August 28, 1978.